

ภาคผนวก ค

เอกสารประกอบมาตรการติดตามตรวจสอบ

ผลกระทบสิ่งแวดล้อม



# ภาคผนวก ค-1

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ใบรับรองผลการวิเคราะห์



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## คุณภาพอากาศในบรรยากาศ



## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Sample Number 244064-1  
Sampled Date Jan 22, 2024  
Sample Description Air Quality  
Location ร่มขอบพื้นที่โรงงาน HDPE1 ด้านทิศใต้  
Date Analysis Commenced Jan 24, 2024  
Condition of Sample Drawn into one quartz filter paper (8x10 inch) placed in plastic bag, one 25-L air sampling bag and one sorbent tube, refrigerated  
Barometric Pressure 761 mmHg  
Atmospheric Temperature 30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Ethylene *	22/01/24 - 23/01/24	ppm	-	1.0	<1.0	No Standard	Based on ASTM, D 2712-23	-	Bangkok
n-Hexane *	22/01/24 - 23/01/24	ppm	-	0.10	<0.10	No Standard	NIOSH (2003), 1500	-	Bangkok
Particulate matter as PM 10	22/01/24 - 23/01/24	mg/m3	-	0.002	0.042	0.12	US EPA 40 CFR Part 50, Appendix J	NEB No.24 Rayong	

### Guideline :

NEB No.24 : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004

Sampled By : Chatchai Sukpia

### Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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TESTING  
No.0042

Lot ID: 244064

Date Received : Jan 23, 2024

Date Reported : Jan 30, 2024

Report Number : 2892371-1

Page 1 of 2



## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Sample Number 244064-2  
Sampled Date Jan 22, 2024  
Sample Description Air Quality  
Location ร่มขอบพื้นที่โรงงาน HDPE1 ด้านทิศใต้  
Date Analysis Commenced Jan 24, 2024  
Condition of Sample Drawn into one quartz filter paper (8x10 inch) placed in plastic bag, one 25-L air sampling bag and one sorbent tube, refrigerated  
Barometric Pressure 761 mmHg  
Atmospheric Temperature 30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Ethylene *	22/01/24 - 23/01/24	ppm	-	1.0	<1.0	No Standard	Based on ASTM, D 2712-23	-	Bangkok
n-Hexane *	22/01/24 - 23/01/24	ppm	-	0.10	<0.10	No Standard	NIOSH (2003), 1500	-	Bangkok
Particulate matter as PM 10	22/01/24 - 23/01/24	mg/m3	-	0.002	0.051	0.12	US EPA 40 CFR Part 50, Appendix J	NEB No.24 Rayong	

### Guideline :

NEB No.24 : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004

Sampled By : Chatchai Sukpia

### Remark :

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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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TESTING  
No.0042

Lot ID: 244064

Date Received : Jan 23, 2024

Date Reported : Jan 30, 2024

Report Number : 2892371-1

Page 2 of 2

Approved by

Thanita K.

Thanita Kulsuriwong  
Scientist (4)

Approved by

Thanita K.

Thanita Kulsuriwong  
Scientist (4)





## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 247014

Date Received : Feb 28, 2024

Date Reported : Mar 11, 2024

Report Number : 2889685-1



TESTING  
No.0042

Sample Number 247014-1  
Sampled Date Feb 27, 2024  
Sample Description Air Quality  
Location ร่มขอบพื้นที่โรงงาน HDPE1 ด้านทิศใต้  
Date Analysis Commenced Feb 29, 2024  
Condition of Sample Drawn into one quartz filter paper (8x10 inch) placed in plastic bag, one 10-L air sampling bag and one sorbent tube, refrigerated  
Barometric Pressure 755 mmHg  
Atmospheric Temperature 31.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Ethylene *	27/02/24 - 28/02/24	ppm	-	1.0	<1.0	No Standard	Based on ASTM, D 2712-23	-	Bangkok
n-Hexane *	27/02/24 - 28/02/24	ppm	-	0.10	0.32	No Standard	NIOSH (2003), 1500	-	Bangkok
Particulate matter as PM 10	27/02/24 - 28/02/24	mg/m3	-	0.002	0.034	0.12	US EPA 40 CFR Part 50, Appendix J	NEB No.24 Rayong	

### Guideline :

NEB No.24 : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004

Sampled By : Siriwit Ruangsom

### Remark :

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Thanita K.

Thanita Kulsuriwong  
Scientist (4)

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 247014

Date Received : Feb 28, 2024

Date Reported : Mar 11, 2024

Report Number : 2889685-1



TESTING  
No.0042

Sample Number 247014-2  
Sampled Date Feb 27, 2024  
Sample Description Air Quality  
Location ร่มขอบพื้นที่โรงงาน HDPE1 ด้านทิศใต้  
Date Analysis Commenced Feb 29, 2024  
Condition of Sample Drawn into one quartz filter paper (8x10 inch) placed in plastic bag, one 10-L air sampling bag and one sorbent tube, refrigerated  
Barometric Pressure 755 mmHg  
Atmospheric Temperature 31.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Ethylene *	27/02/24 - 28/02/24	ppm	-	1.0	<1.0	No Standard	Based on ASTM, D 2712-23	-	Bangkok
n-Hexane *	27/02/24 - 28/02/24	ppm	-	0.10	<0.10	No Standard	NIOSH (2003), 1500	-	Bangkok
Particulate matter as PM 10	27/02/24 - 28/02/24	mg/m3	-	0.002	0.036	0.12	US EPA 40 CFR Part 50, Appendix J	NEB No.24 Rayong	

### Guideline :

NEB No.24 : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004

Sampled By : Siriwit Ruangsom

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Sample Number	2417315-1
Sampled Date	Mar 25, 2024
Sample Description	Air Quality
Location	บริเวณพื้นที่โรงงาน HDPE1 ตำบลโคกเคียน
Date Analysis Commenced	Mar 27, 2024
Condition of Sample	Drawn into one quartz filter paper (8x10 inch) placed in plastic bag, one 25-L air sampling bag and one sorbent tube, refrigerated
Barometric Pressure	761 mmHg
Atmospheric Temperature	32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Ethylene *	25/03/24 - 26/03/24	ppm	-	1.0	<1.0	No Standard	Based on ASTM, D 2712-23	-	Bangkok
n-Hexane *	25/03/24 - 26/03/24	ppm	-	0.10	<0.10	No Standard	NIOSH (2003), 1500	-	Bangkok
Particulate matter as PM 10	25/03/24 - 26/03/24	mg/m3	-	0.002	0.020	0.12	US EPA 40 CFR Part 50, Appendix J	NEB No.24 Rayong	

### Guideline :

NEB No.24 : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004

Sampled By : Satcha Phetsawaeng

### Remark :

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TESTING

No.0042

Lot ID: 2417315

Date Received : Mar 26, 2024

Date Reported : Apr 10, 2024

Report Number : 2910638-1

Page 1 of 2



## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Sample Number	2417315-2
Sampled Date	Mar 25, 2024
Sample Description	Air Quality
Location	บริเวณพื้นที่โรงงาน HDPE1 ตำบลโคกเคียน
Date Analysis Commenced	Mar 27, 2024
Condition of Sample	Drawn into one quartz filter paper (8x10 inch) placed in plastic bag, one 25-L air sampling bag and one sorbent tube, refrigerated
Barometric Pressure	761 mmHg
Atmospheric Temperature	32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Ethylene *	25/03/24 - 26/03/24	ppm	-	1.0	<1.0	No Standard	Based on ASTM, D 2712-23	-	Bangkok
n-Hexane *	25/03/24 - 26/03/24	ppm	-	0.10	<0.10	No Standard	NIOSH (2003), 1500	-	Bangkok
Particulate matter as PM 10	25/03/24 - 26/03/24	mg/m3	-	0.002	0.016	0.12	US EPA 40 CFR Part 50, Appendix J	NEB No.24 Rayong	

### Guideline :

NEB No.24 : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004

Sampled By : Satcha Phetsawaeng

### Remark :

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TESTING

No.0042

Lot ID: 2417315

Date Received : Mar 26, 2024

Date Reported : Apr 10, 2024

Report Number : 2910638-1

Page 2 of 2

Approved by

Thanita K.

Thanita Kulsuriwong  
Scientist (4)





## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2429645

Date Received : Apr 03, 2024

Date Reported : Apr 12, 2024

Report Number : 2937926-1



TESTING  
No.0042

Sample Number	2429645-1
Sampled Date	Apr 01, 2024
Sample Description	Air Quality
Location	บริเวณพื้นที่โรงงาน HDPE1 ด้านทิศเหนือ
Date Analysis Commenced	Apr 04, 2024
Condition of Sample	Drawn into one quartz filter paper (8x10 inch) placed in plastic bag, one 10-L air sampling bag and one sorbent tube, refrigerated
Barometric Pressure	757 mmHg
Atmospheric Temperature	30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Ethylene *	01/04/24 - 02/04/24	ppm	-	1.0	<1.0	No Standard	Based on ASTM, D 2712-23	-	Bangkok
n-Hexane *	01/04/24 - 02/04/24	ppm	-	0.10	0.23	No Standard	NIOSH (2003), 1500	-	Bangkok
Particulate matter as PM 10	01/04/24 - 02/04/24	mg/m3	-	0.002	0.017	0.12	US EPA 40 CFR Part 50, Appendix J	NEB No.24 Rayong	

### Guideline :

NEB No.24 : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004

Sampled By : Anurak Tongkhajonsakda

### Remark :

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Approved by

*Thanita K.*

Thanita Kulsuriwong  
Scientist (4)

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2429645

Date Received : Apr 03, 2024

Date Reported : Apr 12, 2024

Report Number : 2937926-1



TESTING  
No.0042

Sample Number	2429645-2
Sampled Date	Apr 01, 2024
Sample Description	Air Quality
Location	บริเวณพื้นที่โรงงาน HDPE1 ด้านทิศใต้
Date Analysis Commenced	Apr 04, 2024
Condition of Sample	Drawn into one quartz filter paper (8x10 inch) placed in plastic bag, one 10-L air sampling bag and one sorbent tube, refrigerated
Barometric Pressure	757 mmHg
Atmospheric Temperature	30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Ethylene *	01/04/24 - 02/04/24	ppm	-	1.0	<1.0	No Standard	Based on ASTM, D 2712-23	-	Bangkok
n-Hexane *	01/04/24 - 02/04/24	ppm	-	0.10	<0.10	No Standard	NIOSH (2003), 1500	-	Bangkok
Particulate matter as PM 10	01/04/24 - 02/04/24	mg/m3	-	0.002	0.021	0.12	US EPA 40 CFR Part 50, Appendix J	NEB No.24 Rayong	

### Guideline :

NEB No.24 : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004

Sampled By : Anurak Tongkhajonsakda

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*Thanita K.*

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Scientist (4)

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## Analysis / Test Report

**Client** : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
**P/O** : PMM-23-11  
**Project Name** : Environmental Monitoring  
**Project Location** : TPE Site 1

**Sample Number** : 2444053-1  
**Sampled Date** : May 08, 2024  
**Sample Description** : Air Quality  
**Location** : รั้วรอบพื้นที่โรงงาน HDPE1 ตำบลพุดใหม่  
**Date Analysis Commenced** : May 10, 2024  
**Condition of Sample** : Contained in one quartz filter paper (8x10 inch) placed in plastic bag, one 10-L air sampling bag and one sorbent tube, refrigerated  
**Barometric Pressure** : 776 mmHg  
**Atmospheric Temperature** : 32.2 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Ethylene *	08/05/24 - 09/05/24	ppm	-	1.0	<1.0	No Standard	Based on ASTM, D 2712-23	-	Bangkok
n-Hexane *	08/05/24 - 09/05/24	ppm	-	0.10	<0.10	No Standard	NIOSH (2003), 1500	-	Bangkok
Particulate matter as PM 10	08/05/24 - 09/05/24	mg/m3	-	0.002	0.016	0.12	US EPA 40 CFR Part 50, Appendix J	NEB No.24 Rayong	

**Guideline** :  
NEB No.24 : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004  
**Sampled By** : Anurak Tongkhajonsakda

**Remark** :  
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TESTING  
No.0042

**Lot ID: 2444053**  
Date Received : May 09, 2024  
Date Reported : May 21, 2024  
Report Number : 2969635-1



## Analysis / Test Report

**Client** : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
**P/O** : PMM-23-11  
**Project Name** : Environmental Monitoring  
**Project Location** : TPE Site 1

**Sample Number** : 2444053-2  
**Sampled Date** : May 08, 2024  
**Sample Description** : Air Quality  
**Location** : รั้วรอบพื้นที่โรงงาน HDPE1 ตำบลพุดใหม่  
**Date Analysis Commenced** : May 10, 2024  
**Condition of Sample** : Contained in one quartz filter paper (8x10 inch) placed in plastic bag, one 10-L air sampling bag and one sorbent tube, refrigerated  
**Barometric Pressure** : 776 mmHg  
**Atmospheric Temperature** : 32.2 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Ethylene *	08/05/24 - 09/05/24	ppm	-	1.0	<1.0	No Standard	Based on ASTM, D 2712-23	-	Bangkok
n-Hexane *	08/05/24 - 09/05/24	ppm	-	0.10	<0.10	No Standard	NIOSH (2003), 1500	-	Bangkok
Particulate matter as PM 10	08/05/24 - 09/05/24	mg/m3	-	0.002	0.017	0.12	US EPA 40 CFR Part 50, Appendix J	NEB No.24 Rayong	

**Guideline** :  
NEB No.24 : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004  
**Sampled By** : Anurak Tongkhajonsakda

**Remark** :  
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TESTING  
No.0042

**Lot ID: 2444053**  
Date Received : May 09, 2024  
Date Reported : May 21, 2024  
Report Number : 2969635-1

Approved by

Thanita K.

Thanita Kulsuriwong  
Scientist (4)





## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Sample Number 2459759-1  
Sampled Date Jun 11, 2024  
Sample Description Air Quality  
Location วิทยาลัยโชนง HDPE1 ตำบลโคก  
Date Analysis Commenced Jun 13, 2024  
Condition of Sample Drawn into one quartz filter paper (8x10 inch) placed in plastic bag, one 10-L air sampling bag and one sorbent tube,  
refrigerated  
Barometric Pressure 757 mmHg  
Atmospheric Temperature 29.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Ethylene *	11/06/24 - 12/06/24	ppm	-	1.0	<1.0	No Standard	Based on ASTM, D 2712-23	-	Bangkok
n-Hexane *	11/06/24 - 12/06/24	ppm	-	0.10	<0.10	No Standard	NIOSH (2003), 1500	-	Bangkok
Particulate matter as PM 10	11/06/24 - 12/06/24	mg/m3	-	0.002	0.010	0.12	US EPA 40 CFR Part 50, Appendix J	NEB No.24 Rayong	

### Guideline :

NEB No.24 : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004

Sampled By : Anurak Tongkhajonsakda

### Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.



TESTING  
No.0042

Lot ID: 2459759

Date Received : Jun 12, 2024

Date Reported : Jun 24, 2024

Report Number : 3004015-1

Page 1 of 2



## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Sample Number 2459759-2  
Sampled Date Jun 11, 2024  
Sample Description Air Quality  
Location วิทยาลัยโชนง HDPE1 ตำบลโคก  
Date Analysis Commenced Jun 13, 2024  
Condition of Sample Drawn into one quartz filter paper (8x10 inch) placed in plastic bag, one 10-L air sampling bag and one sorbent tube,  
refrigerated  
Barometric Pressure 757 mmHg  
Atmospheric Temperature 29.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Ethylene *	11/06/24 - 12/06/24	ppm	-	1.0	<1.0	No Standard	Based on ASTM, D 2712-23	-	Bangkok
n-Hexane *	11/06/24 - 12/06/24	ppm	-	0.10	<0.10	No Standard	NIOSH (2003), 1500	-	Bangkok
Particulate matter as PM 10	11/06/24 - 12/06/24	mg/m3	-	0.002	0.011	0.12	US EPA 40 CFR Part 50, Appendix J	NEB No.24 Rayong	

### Guideline :

NEB No.24 : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004

Sampled By : Anurak Tongkhajonsakda

### Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.



TESTING  
No.0042

Lot ID: 2459759

Date Received : Jun 12, 2024

Date Reported : Jun 24, 2024

Report Number : 3004015-1

Page 2 of 2

Approved by

Thanita K.

Thanita Kulsuriwong  
Scientist (4)

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Thanita K.

Thanita Kulsuriwong  
Scientist (4)

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ค่าเฉลี่ย



## Analysis / Test Report



TESTING  
No.0042

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand  
21150

P/O :  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1

Lot ID: 244070  
Date Received :Jan 12, 2024  
Date Reported :Jan 19, 2024  
Report Number :2883664-1

Page 1 of 1

Sample Number	244070-1					
Sampled Date	Jan 12, 2024 11:05 AM					
Sample Description	Wastewater					
Location	บ่อพักน้ำทิ้งรวมของอาคารสำนักงานในพื้นที่ TPE Site#1					
Date Analysis Commenced	Jan 12, 2024					
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)					
Analyte	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
<b>Water Testing</b>						
BOD (5 days at 20 Degree C)	mg/L	-	2.0	171	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
Oil & Grease	mg/L	-	3	10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Sulfide *	mg/L	-	0.5	5.1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (C, F)	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	590	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	123	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	54	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Sampling By : Paramet Sattayakun โทรเลขเลขที่ ๖-323-๙-9476

Remark :  
- LOD : Limit of Detection  
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)  
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- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

N. Banphit

Narumon Banchongkit  
Supervisor  
โทรเลขเลขที่ ๖-323-๙-9445

Approved by

D. Changchon

Dej Changchon  
Senior Manager  
โทรเลขเลขที่ ๖-323-๙-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand  
21150

P/O :  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1

Lot ID: 244070  
Date Received :Jan 12, 2024  
Date Reported :Jan 19, 2024  
Report Number :2883664-2

Page 1 of 1

Sample Number	244070-1					
Sampled Date	Jan 12, 2024 11:05 AM					
Sample Description	Wastewater					
Location	บ่อพักน้ำทิ้งรวมของอาคารสำนักงานในพื้นที่ TPE Site#1					
Date Analysis Commenced	Jan 13, 2024					
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)					
Analyte	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
<b>Water Testing</b>						
Settleable Solid	mL/L/hr	-	0.1	0.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 F	Rayong

Sampling By : Paramet Sattayakun

Remark :  
- LOD : Limit of Detection  
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

N. Banphit

Narumon Banchongkit  
Supervisor

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## Analysis / Test Report



TESTING

No.0042

Lot ID: 244073

Date Received : Jan 12, 2024

Date Reported : Jan 19, 2024

Report Number : 2883671-1

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location: TPE Site 1

Page 1 of 2

Sample Number	244073-1
Sampled Date	Jan 12, 2024 11:00 AM
Sample Description	Wastewater
Location	โรงงานน้ำร้อนพื้นที่ TPE Site#1
Date Analysis Commenced	Jan 12, 2024
Condition of Sample	Contained in four glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	2.3	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	33	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	14	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	13	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.8	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	31.4	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	708	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	6	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banphit

Narumon Banchongkit  
Supervisor

ทะเบียนเลขที่ 7-323-ก-9445

Approved by

D. Chanchon

Dej Chanchon  
Senior Manager

ทะเบียนเลขที่ 7-323-ก-9442

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## Analysis / Test Report



TESTING

No.0042

Lot ID: 244073

Date Received : Jan 12, 2024

Date Reported : Jan 19, 2024

Report Number : 2883671-1

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location: TPE Site 1

Page 2 of 2

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).  
**Sampling By :** Paramet Sattayakun ทะเบียนเลขที่ 7-323-ก-9476 , Thanasoun Namakunna ทะเบียนเลขที่ 7-204-ก-8592

Remark :

- LOD : Limit of Detection
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Technical Management

N. Banphit

Narumon Banchongkit  
Supervisor

ทะเบียนเลขที่ 7-323-ก-9445

Approved by

D. Chanchon

Dej Chanchon  
Senior Manager

ทะเบียนเลขที่ 7-323-ก-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 244073

Date Received : Jan 12, 2024

Date Reported : Jan 19, 2024

Report Number : 2883671-2

Page 1 of 1

Sample Number	244073-1
Sampled Date	Jan 12, 2024 11:00 AM
Sample Description	Wastewater
Location	โรงงานน้ำรวมพื้นที่ TPE Site#1
Date Analysis Commenced	Jan 12, 2024
Condition of Sample	Contained in four glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
Chloride as Cl	mg/L	0.5	1	140	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (D)	Rayong
n-Hexane	mg/L	-	0.001	0.05	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Total Organic Carbon	mg/L	0.01	0.1	12.1	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Paramet Sattayakun , Thanasoun Namakunna

Remark :

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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

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Approved by

Siriluk P.

Siriluk Puenggang  
Section Head

ADDRESS 104 Phatthanakan Rd., Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197  
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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1



TESTING

No.0042

Lot ID: 244074

Date Received : Jan 12, 2024

Date Reported : Jan 19, 2024

Report Number : 2883666-1

Page 1 of 2

Sample Number	244074-1
Sampled Date	Jan 12, 2024 10:45 AM
Sample Description	Wastewater
Location	หลังงาน API Separator ของโรงงาน HDPE#1
Date Analysis Commenced	Jan 12, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	<5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	<5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C	-	-	-	7.8	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	30.5	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	132	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	8	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banngkit

Narumon Banchongkit  
Supervisor

ทะเบียนเลขที่ 2-323-2-9445

Approved by

D. Changchon

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ 2-323-2-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1



TESTING  
No.0042  
Lot ID: 244074  
Date Received : Jan 12, 2024  
Date Reported : Jan 19, 2024  
Report Number : 2883666-1

Page 2 of 2

**Guideline** : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By** : Paramet Sattayakun ทะเบียนเลขที่ ๖-323-๖-9476 , Thanasoun Namakunna ทะเบียนเลขที่ ๖-204-๖-8592

Remark :

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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 244074

Date Received : Jan 12, 2024

Date Reported : Jan 19, 2024

Report Number : 2883666-2

Page 1 of 1

Sample Number	244074-1
Sampled Date	Jan 12, 2024 10:45 AM
Sample Description	Wastewater
Location	หลังคา API Separator ของโรงงาน HDPE#1
Date Analysis Commenced	Jan 13, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
n-Hexane	mg/L	-	0.001	0.01	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok

**Guideline** : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By** : Paramet Sattayakun , Thanasoun Namakunna

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Technical Management

N. Banphit

Narumon Banchongkit  
Supervisor  
ทะเบียนเลขที่ ๖-323-๖-9445

Approved by

D. Changchon

Dej Changchon  
Senior Manager  
ทะเบียนเลขที่ ๖-323-๖-9442

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Approved by

Siriluk P.

Siriluk Puengpang  
Section Head

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1



TESTING

No.0042

Lot ID: 244084

Date Received : Jan 12, 2024

Date Reported : Jan 19, 2024

Report Number : 2883675-1

Page 1 of 2

Sample Number	244084-						
Sampled Date	Jan 12, 2024 10:50 AM						
Sample Description	Wastewater						
Location	Final Check Pond ของโรงงาน LDPE						
Date Analysis Commenced	Jan 12, 2024						
Condition of Sample	Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	7	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	6	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	31.6	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	232	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banthit

Narumon Banchongkit  
Supervisor

หมายเลข 7-323-9-9445

Approved by

D. Chongchon

Dej Changchon  
Senior Manager

หมายเลข 7-323-9-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1



TESTING

No.0042

Lot ID: 244084

Date Received : Jan 12, 2024

Date Reported : Jan 19, 2024

Report Number : 2883675-1

Page 2 of 2

**Guideline** : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).  
**Sampling By** : Paramet Sattayakun หมายเลข 7-323-9-9476 , Thanasoun Namakunna หมายเลข 7-204-9-8592

Remark :

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- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

N. Banthit

Narumon Banchongkit  
Supervisor

หมายเลข 7-323-9-9445

Approved by

D. Chongchon

Dej Changchon  
Senior Manager

หมายเลข 7-323-9-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 244084

Date Received : Jan 12, 2024

Date Reported : Jan 19, 2024

Report Number : 2883675-2

Page 1 of 1

Sample Number	244084-1						
Sampled Date	Jan 12, 2024 10:50 AM						
Sample Description	Wastewater						
Location	Final Check Pond ของโรงงาน LDPE						
Date Analysis Commenced	Jan 12, 2024						
Condition of Sample	Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
Chloride as Cl	mg/L	0.5	1	59	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (D)	Rayong
Total Organic Carbon	mg/L	0.01	0.1	4.99	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

**Guideline** : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By** : Paramet Sattayakun , Thanasoun Namakunna

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

Siriluk P.

Siriluk Puengpang  
Section Head

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand  
21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1



TESTING  
No.0042

Lot ID: 247058

Date Received : Feb 02, 2024

Date Reported : Feb 09, 2024

Report Number : 2889751-1

Page 1 of 1

Sample Number	247058-1					
Sampled Date	Feb 02, 2024 11:04 AM					
Sample Description	Wastewater					
Location	ปลั๊กน้ำทิ้งรวมของอาคารสำนักงานในพื้นที่ TPE Site#1					
Date Analysis Commenced	Feb 02, 2024					
Condition of Sample	Contained in one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)					
Analyte	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
Water Testing						
BOD (5 days at 20 Degree C)	mg/L	-	2.0	190	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
Oil & Grease	mg/L	-	3	8	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.3	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Sulfide *	mg/L	-	0.5	1.3	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-52 (C, F)	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	584	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	113	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	60	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

**Sampling By** : Wanlop Hunchainawong ทะเบียนเลขที่ 7-323-9-9457

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Technical Management

N. Banphit

Narumon Banchongkit  
Supervisor

ทะเบียนเลขที่ 7-323-9-9445

Approved by

D. Changchon

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ 7-323-9-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand 21150

P/O :  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1

Lot ID: 247058  
Date Received : Feb 02, 2024  
Date Reported : Feb 09, 2024  
Report Number : 2889751-2

Sample Number	247058-1					
Sampled Date	Feb 02, 2024 11:04 AM					
Sample Description	Wastewater					
Location	บ่อกักน้ำทิ้งรวมของอาคารสำนักงานในพื้นที่ TPE Site#1					
Date Analysis Commenced	Feb 03, 2024					
Condition of Sample	Contained in one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)					
Analyte	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
Water Testing						
Settleable Solid	mL/L/hr	-	0.1	<0.1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 F	Rayong

Sampling By : Wanlop Hunchainao

Remark :  
- LOD : Limit of Detection  
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Page 1 of 1



## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand 21150

P/O :  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1



TESTING  
No.0042

Lot ID: 247060  
Date Received : Feb 02, 2024  
Date Reported : Feb 10, 2024  
Report Number : 2889752-1

Sample Number	247060-1						
Sampled Date	Feb 02, 2024 10:40 AM						
Sample Description	Wastewater						
Location	หลังคา API Separator โรงโรงงาน HDPE#1						
Date Analysis Commenced	Feb 02, 2024						
Condition of Sample	Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	12.4	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	32	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	8	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	8	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.3	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	37.5	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	212	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : Wanlop Hunchainao โทร: 323-9457, Kardbundi Kitisupavanit โทร: 204-9-0001

Approved by

N. Banongkit

Narumon Banhongkit  
Supervisor

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Technical Management

N. Banongkit

Narumon Banhongkit  
Supervisor  
โทร: 323-9445

Approved by

D. Changchon

Dej Changchon  
Senior Manager  
โทร: 323-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1



TESTING  
No.0042

Lot ID: 247060

Date Received : Feb 02, 2024

Date Reported : Feb 10, 2024

Report Number : 2889752-1

Page 2 of 2

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 247060

Date Received : Feb 02, 2024

Date Reported : Feb 09, 2024

Report Number : 2889752-2

Page 1 of 1

Sample Number

247060-1

Sample Date

Feb 02, 2024 10:40 AM

Sample Description

Wastewater

Location

หลังคา API Separator โรงโรงแยก HDPE#1

Date Analysis Commenced

Feb 03, 2024

Condition of Sample

Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
n-Hexane	mg/L	-	0.001	8.008	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Wanlop Hunchainaow , Kardbudit Kitisupavanit

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Technical Management

N. Banchongkit

Narumon Banchongkit  
Supervisor

โทร: 09-09445-323

Approved by

D. Changchon

Dej Changchon  
Senior Manager

โทร: 09-09442-323

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Approved by

Suwimon C.

Suwimon Chairuangwut  
Scientist (3)

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location :



TESTING

No.0042

Lot ID: 2416602

Date Received : Feb 13, 2024

Date Reported : Feb 19, 2024

Report Number : 2908855-1

Page 1 of 1

Sample Number	2416602-1
Sampled Date	Feb 13, 2024 10:08 AM
Sample Description	Wastewater
Location	หลังบ้าน API Separator ของโรงงาน HDPE#1
Date Analysis Commenced	Feb 14, 2024
Condition of Sample	Contained in one plastic bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

**Guideline** : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By** : Wanlop Hunchainaw ทนเบญจเดชที่ 3-323-9-9457

Remark :

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Technical Management

N. Banchookit

Narumon Banchongkit  
Supervisor  
ทะเบียนเลขที่ 3-323-9-9445

Approved by

D. Chumon

Dej Changchon  
Senior Manager  
ทะเบียนเลขที่ 3-323-9-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1



TESTING

No.0042

Lot ID: 247074

Date Received : Feb 02, 2024

Date Reported : Feb 10, 2024

Report Number : 2889766-1

Page 1 of 2

Sample Number	247074-1
Sampled Date	Feb 02, 2024 10:58 AM
Sample Description	Wastewater
Location	รางระบายน้ำรวมพื้นที่ TPE Site#1
Date Analysis Commenced	Feb 02, 2024
Condition of Sample	Contained in four glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	2.1	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	32	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	14	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	13	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	34.1	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	776	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	26	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banchookit

Narumon Banchongkit  
Supervisor  
ทะเบียนเลขที่ 3-323-9-9445

Approved by

D. Chumon

Dej Changchon  
Senior Manager  
ทะเบียนเลขที่ 3-323-9-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1



TESTING

No.0042

Lot ID: 247074

Date Received : Feb 02, 2024

Date Reported : Feb 10, 2024

Report Number : 2889766-1

Page 2 of 2

**Guideline** : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By** : Wanlop Hunchainaow ทะเบียนเลขที่ ๖-323-๖-9457 , Kardbudit Kitisupavanit ทะเบียนเลขที่ ๖-204-๖-0001

Remark :

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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.



## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 247074

Date Received : Feb 02, 2024

Date Reported : Feb 10, 2024

Report Number : 2889766-2

Page 1 of 1

Sample Number	247074-1						
Sampled Date	Feb 02, 2024 10:58 AM						
Sample Description	Wastewater						
Location	รางระบายน้ำรวมพื้นที่ TPE Site#1						
Date Analysis Commenced	Feb 02, 2024						
Condition of Sample	Contained in four glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Chloride as Cl	mg/L	0.5	1	216	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (D)	Rayong
Flow rate	m3/s	-	-	0.020	No Standard	Flow meter	Rayong
n-Hexane	mg/L	-	0.001	1.499	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Total Organic Carbon	mg/L	0.01	0.1	12.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

**Guideline** : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By** : Wanlop Hunchainaow , Kardbudit Kitisupavanit

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Technical Management

N. Banchongkit

Narumon Banchongkit  
Supervisor

ทะเบียนเลขที่ ๖-323-๖-9445

Approved by

D. Changchon

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ๖-323-๖-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1



TESTING

No.0042

Lot ID: 247075

Date Received : Feb 02, 2024

Date Reported : Feb 10, 2024

Report Number : 2889772-1

Page 1 of 2

Sample Number	247075-1
Sampled Date	Feb 02, 2024 10:48 AM
Sample Description	Wastewater
Location	Final Check Pond โรงโม่โรงงาน LDPE
Date Analysis Commenced	Feb 02, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	3.2	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	31	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	10	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	9	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.4	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	34.6	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	572	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	34	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banphit

Narumon Banchongkit  
Supervisor

ทะเบียนเลขที่ 7-323-ก-9445

Approved by

D. Changchon

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ 7-323-ก-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1



TESTING

No.0042

Lot ID: 247075

Date Received : Feb 02, 2024

Date Reported : Feb 10, 2024

Report Number : 2889772-1

Page 2 of 2

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).  
**Sampling By :** Wanlop Hunchainaoว ทะเบียนเลขที่ 7-323-ก-9457 , Kardbundit Kitisupavanit ทะเบียนเลขที่ 7-204-ก-0001

Remark :

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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

N. Banphit

Narumon Banchongkit  
Supervisor

ทะเบียนเลขที่ 7-323-ก-9445

Approved by

D. Changchon

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ 7-323-ก-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 247075

Date Received : Feb 02, 2024

Date Reported : Feb 10, 2024

Report Number : 2889772-2

Page 1 of 1

Sample Number	247075-1						
Sampled Date	Feb 02, 2024 10:48 AM						
Sample Description	Wastewater						
Location	Final Check Pond ของโรงงาน LDPE						
Date Analysis Commenced	Feb 02, 2024						
Condition of Sample	Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
Chloride as Cl	mg/L	0.5	1	188	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (D)	Rayong
Flow rate	m3/s	-	-	0.032	No Standard	Flow meter	Rayong
Total Organic Carbon	mg/L	0.01	0.1	7.84	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Wanlop Hunchainaw , Kardbundit Kitsupavanit

Remark :

- LOD : Limit of Detection
- "c" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

N. Banngkit

Narumon Banchongkit  
Supervisor

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand  
21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1



TESTING

No.0042

Lot ID: 2417316

Date Received : Mar 04, 2024

Date Reported : Mar 11, 2024

Report Number : 2910644-1

Page 1 of 1

Sample Number	2417316-1						
Sampled Date	Mar 04, 2024 11:38 AM						
Sample Description	Wastewater						
Location	บ่อพักน้ำที่รวมของอาคารสำนักงานในพื้นที่ TPE Site#1						
Date Analysis Commenced	Mar 04, 2024						
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
<b>Water Testing</b>						
BOD (5 days at 20 Degree C)	mg/L	-	2.0	140	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
Oil & Grease	mg/L	-	3	8	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C	-	-	-	7.4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Sulfide *	mg/L	-	0.5	6.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (C, F)	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	496	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	104	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	62	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

**Sampling By :** Paramet Sattayakun ทะเบียนเลขที่ 3-323-9-9476

Remark :

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Technical Management

N. Banngkit

Narumon Banchongkit  
Supervisor

ทะเบียนเลขที่ 3-323-9-9445

Approved by

D. Changchon

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ 3-323-9-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand 21150  
P/O : PMM-23-11  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1

Lot ID: 2417316  
Date Received : Mar 04, 2024  
Date Reported : Mar 11, 2024  
Report Number : 2910644-2

Sample Number	2417316-1					
Sampled Date	Mar 04, 2024 11:38 AM					
Sample Description	Wastewater					
Location	บ่อกักน้ำทิ้งรวมของอาคารสำนักงานในพื้นที่ TPE Site#1					
Date Analysis Commenced	Mar 05, 2024					
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)					
Analyte	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
<b>Water Testing</b>						
Settleable Solid	ml/L/hr	-	0.1	<0.1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 F	Rayong

Sampling By : Paramet Sattayakun

Remark :  
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Approved by

*N. Banongkit*

Narumon Banchongkit  
Supervisor

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand 21150  
P/O : PMM-23-11  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1



TESTING

No.0042

Lot ID: 2417324  
Date Received : Mar 25, 2024  
Date Reported : Apr 04, 2024  
Report Number : 2910654-1

Sample Number	2417324-1					
Sampled Date	Mar 25, 2024 10:05 AM					
Sample Description	Wastewater					
Location	หลังบ้าน API Separator ของโรงงาน HDPE#1					
Date Analysis Commenced	Mar 25, 2024					
Condition of Sample	Contained in one amber glass bottle, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)					

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	2.9	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	<5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	<5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.2	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	37.0	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	206	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).  
Sampling By : Chainusorn Lertnathakunchai ทะเบียนเลขที่ ว-323-ก-9461, Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-ก-0001

Technical Management

*Photchana S.*

Photchana Seeda  
Scientist (4)  
ทะเบียนเลขที่ ว-323-ก-9446

Approved by

*D. Changchon*

Dej Changchon  
Senior Manager  
ทะเบียนเลขที่ ว-323-ก-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1



TESTING  
No.0042  
Lot ID: 2417324

Date Received : Mar 25, 2024

Date Reported : Apr 04, 2024

Report Number : 2910654-1

Page 2 of 2

### Remark :

- LOD : Limit of Detection
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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2417324

Date Received : Mar 25, 2024

Date Reported : Mar 30, 2024

Report Number : 2910654-2

Page 1 of 1

Sample Number	2417324-1					
Sampled Date	Mar 25, 2024 10:05 AM					
Sample Description	Wastewater					
Location	หลังบ้าน API Separator ของโรงงาน HDPE#1					
Date Analysis Commenced	Mar 27, 2024					
Condition of Sample	Contained in one amber glass bottle, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)					
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method
Water Testing						
n-Hexane	mg/L	-	0.001	2.070	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Chainusorn Lertnanthakunchai , Kardsundit Kitisupavanit

### Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Technical Management

Photchana S.

Photchana Seeda

Scientist (4)

โทรศัพท์ 0-323-9-9446

Approved by

D. Changchon

Dej Changchon

Senior Manager

โทรศัพท์ 0-323-9-9442

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Approved by

Suwimon C.

Suwimon Chairuangwut

Scientist (3)

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :

Project Name : Environmental Monitoring

Project Location :

Sample Number 2436113-1  
Sampled Date Mar 29, 2024 10:00 AM  
Sample Description Wastewater  
Location แหล่งน้ำ API Separator โรงโรงงาน HDPE#1  
Date Analysis Commenced Mar 30, 2024  
Condition of Sample Contained in one plastic bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	24	≤50	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

**Guideline** : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By** : Wanlop Hunchainaw ทนายณเดชที่ ๖-323-๖-9457

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.



TESTING

No.0042

Lot ID: 2436113

Date Received : Mar 29, 2024

Date Reported : Apr 04, 2024

Report Number : 2950529-1

Page 1 of 1



## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Sample Number 2417334-1  
Sampled Date Mar 04, 2024 11:25 AM  
Sample Description Wastewater  
Location รางระบายน้ำรวมพื้นที่ TPE Site#1  
Date Analysis Commenced Mar 04, 2024  
Condition of Sample Contained in one amber glass bottle, four glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)  
Physical Property Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	26	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	14	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	12	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.5	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	33.8	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	400	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong



TESTING

No.0042

Lot ID: 2417334

Date Received : Mar 04, 2024

Date Reported : Mar 12, 2024

Report Number : 2910655-1

Page 1 of 2

Technical Management

N. Banongkit

Narumon Banhongkit  
Supervisor

ทะเบียนเลขที่ ๖-323-๖-9445

Approved by

D. Changchon

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ๖-323-๖-9442

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Technical Management

N. Banongkit

Narumon Banhongkit  
Supervisor

ทะเบียนเลขที่ ๖-323-๖-9445

Approved by

D. Changchon

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ๖-323-๖-9442

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## Analysis / Test Report

TESTING  
No.0042

Lot ID: 2417334

Date Received : Mar 04, 2024

Date Reported : Mar 12, 2024

Report Number : 2910655-1

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Sample Number	2417334-1
Sampled Date	Mar 04, 2024 11:25 AM
Sample Description	Wastewater
Location	โรงงานน้ำรวมพื้นที่ TPE Site#1
Date Analysis Commenced	Mar 04, 2024
Condition of Sample	Contained in one amber glass bottle, four glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Page 2 of 2

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	14	≤50	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Paramet Sattayakun ทะเบียนเลขที่ ๖-323-๖-9476 , Panupong Manit ทะเบียนเลขที่ ๖-204-๖-0109

Remark :

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Technical Management

N. Banongkit

Narumon Banhongkit  
Supervisor

ทะเบียนเลขที่ ๖-323-๖-9445

Approved by

D. Changchon

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ๖-323-๖-9442

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## Analysis / Test Report

Lot ID: 2417334

Date Received : Mar 04, 2024

Date Reported : Mar 12, 2024

Report Number : 2910655-2

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Sample Number	2417334-1
Sampled Date	Mar 04, 2024 11:25 AM
Sample Description	Wastewater
Location	โรงงานน้ำรวมพื้นที่ TPE Site#1
Date Analysis Commenced	Mar 04, 2024
Condition of Sample	Contained in one amber glass bottle, four glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and turbid

Page 1 of 1

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
Chloride as Cl	mg/L	0.5	1	118	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (D)	Rayong
n-Hexane	mg/L	-	0.001	0.54	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Total Organic Carbon	mg/L	0.01	0.1	7.61	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Paramet Sattayakun , Panupong Manit

Remark :

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
P/O : PMM-23-11  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1



TESTING  
No.0042  
Lot ID: 2417336  
Date Received : Mar 04, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2910658-1

Page 1 of 2

Sample Number	2417336-1						
Sampled Date	Mar 04, 2024 11:10 AM						
Sample Description	Wastewater						
Location	Final Check Pond ของโรงงาน LDPE						
Date Analysis Commenced	Mar 04, 2024						
Condition of Sample	Contained in one amber glass bottle, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	12	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	12	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C	-	-	-	7.3	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	33.5	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	290	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	17	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banngkit

Narumon Banchongkit  
Supervisor  
ทะเบียนเลขที่ ๖-323-๖-9445

Approved by

D. Chongchon

Dej Changchon  
Senior Manager  
ทะเบียนเลขที่ ๖-323-๖-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
P/O : PMM-23-11  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1



TESTING  
No.0042  
Lot ID: 2417336  
Date Received : Mar 04, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2910658-1

Page 2 of 2

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).  
**Sampling By :** Paramet Sattayakun ทะเบียนเลขที่ ๖-323-๖-9476 , Panupong Manit ทะเบียนเลขที่ ๖-204-๖-0109

Remark :

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Technical Management

N. Banngkit

Narumon Banchongkit  
Supervisor  
ทะเบียนเลขที่ ๖-323-๖-9445

Approved by

D. Chongchon

Dej Changchon  
Senior Manager  
ทะเบียนเลขที่ ๖-323-๖-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2417336

Date Received : Mar 04, 2024

Date Reported : Mar 12, 2024

Report Number : 2910658-2

Page 1 of 1

Sample Number	2417336-1						
Sampled Date	Mar 04, 2024 11:10 AM						
Sample Description	Wastewater						
Location	Final Check Pond ของโรงงาน LDPE						
Date Analysis Commenced	Mar 04, 2024						
Condition of Sample	Contained in one amber glass bottle, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
Chloride as Cl	mg/L	0.5	1	91	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (D)	Rayong
Total Organic Carbon	mg/L	0.01	0.1	5.49	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Paramet Sattayakun , Panupong Manit

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand  
21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2429648

Date Received : Apr 05, 2024

Date Reported : Apr 12, 2024

Report Number : 2937937-1

Page 1 of 1

Sample Number	2429648-1					
Sampled Date	Apr 05, 2024 11:05 AM					
Sample Description	Wastewater					
Location	บ่อกักน้ำที่รวมของอาคารสำนักงานในพื้นที่ TPE Site#1					
Date Analysis Commenced	Apr 05, 2024					
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)					
Analyte	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
Water Testing						
BOD (5 days at 20 Degree C)	mg/L	-	2.0	152	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
Oil & Grease	mg/L	-	3	8	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C	-	-	-	7.2	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Sulfide *	mg/L	-	0.5	1.8	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (C, F)	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	564	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	88.6	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	58	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

**Sampling By :** Paramet Sattayakun ทะเบียนเลขที่ ๖-323-๖-9476

Remark :

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Technical Management

N. Banthit

Narumon Banchongkit  
Supervisor

ทะเบียนเลขที่ ๖-323-๖-9445

Approved by

D. Chumon

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ๖-323-๖-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand 21150  
P/O : PMM-23-11  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1

Lot ID: 2429648  
Date Received : Apr 05, 2024  
Date Reported : Apr 12, 2024  
Report Number : 2937937-2

Sample Number	2429648-1					
Sampled Date	Apr 05, 2024 11:05 AM					
Sample Description	Wastewater					
Location	บ่อกักน้ำทิ้งรวมของอาคารสำนักงานในพื้นที่ TPE Site#1					
Date Analysis Commenced	Apr 06, 2024					
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)					
Analyte	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
<b>Water Testing</b>						
Settleable Solid	ml/L/hr	-	0.1	<0.1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 F	Rayong

Sampling By : Paramet Sattayakun

Remark :  
- LOD : Limit of Detection  
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

*N. Banchoangkit*

Narumon Banchoangkit  
Supervisor

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand 21150  
P/O : PMM-23-11  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1



TESTING

No.0042

Lot ID: 2429697

Date Received : Apr 19, 2024  
Date Reported : Apr 27, 2024  
Report Number : 2937951-1

Sample Number	2429697-1						
Sampled Date	Apr 19, 2024 2:00 PM						
Sample Description	Wastewater						
Location	หลังบ้าน API Separator ของโรงงาน HDPE#1						
Date Analysis Commenced	Apr 19, 2024						
Condition of Sample	Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	<5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	<5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.5	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	34.2	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	184	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	6	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

*N. Banchoangkit*

Narumon Banchoangkit  
Supervisor

ทะเบียนเลขที่ 2-323-2-9445

Approved by

*D. Changchon*

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ 2-323-2-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1



TESTING  
No.0042  
Lot ID: 2429697

Date Received : Apr 19, 2024

Date Reported : Apr 27, 2024

Report Number : 2937951-1

Page 2 of 2

**Guideline** : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By** : Paramet Sattayakun ทะเบียนเลขที่ 323-ก-9476 , Kardbundit Kitisupavanit ทะเบียนเลขที่ 204-ก-0001

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.



## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2429697

Date Received : Apr 19, 2024

Date Reported : Apr 26, 2024

Report Number : 2937951-2

Page 1 of 1

Sample Number	2429697-1
Sampled Date	Apr 19, 2024 2:00 PM
Sample Description	Wastewater
Location	พลัสคาร์บอน API Separator โรงงาน HDPE#1
Date Analysis Commenced	Apr 23, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
n-Hexane	mg/L	-	0.001	0.12	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok

**Guideline** : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By** : Paramet Sattayakun , Kardbundit Kitisupavanit

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Technical Management

N. Banphit

Narumon Banchongkit  
Supervisor  
ทะเบียนเลขที่ 323-ก-9445

Approved by

D. Changchon

Dej Changchon  
Senior Manager  
ทะเบียนเลขที่ 323-ก-9442

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Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand PHONE +66 0 2760 3000 FAX +66 0 2760 3197  
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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
P/O : PMM-23-11  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1



TESTING  
No.0042  
Lot ID: 2429701  
Date Received : Apr 05, 2024  
Date Reported : Apr 13, 2024  
Report Number : 2937956-1

Page 1 of 2

Sample Number 2429701-1  
Sampled Date Apr 05, 2024 11:01 AM  
Sample Description Wastewater  
Location โรงระบายน้ำรวมพื้นที่ TPE Site#1  
Date Analysis Commenced Apr 05, 2024  
Condition of Sample Contained in four glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	4.7	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	37	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	10	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	9	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	34.2	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	636	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	20	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banchookit

Narumon Banchongkit  
Supervisor  
ทะเบียนเลขที่ 7-323-ก-9445

Approved by

D. Chumon

Dej Changchon  
Senior Manager  
ทะเบียนเลขที่ 7-323-ก-9442

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## Analysis / Test Report

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Thailand 21150  
P/O : PMM-23-11  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1



TESTING  
No.0042  
Lot ID: 2429701  
Date Received : Apr 05, 2024  
Date Reported : Apr 13, 2024  
Report Number : 2937956-1

Page 2 of 2

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).  
Sampling By : Paramet Sattayakun ทะเบียนเลขที่ 7-323-ก-9476 , Kardbudit Kitisupavanit ทะเบียนเลขที่ 7-204-ก-0001

Remark :

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Technical Management

N. Banchookit

Narumon Banchongkit  
Supervisor  
ทะเบียนเลขที่ 7-323-ก-9445

Approved by

D. Chumon

Dej Changchon  
Senior Manager  
ทะเบียนเลขที่ 7-323-ก-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
P/O : PMM-23-11  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1

Lot ID: 2429701  
Date Received : Apr 05, 2024  
Date Reported : Apr 13, 2024  
Report Number : 2937956-2

Page 1 of 1

Sample Number 2429701-1  
Sampled Date Apr 05, 2024 11:01 AM  
Sample Description Wastewater  
Location โรงงานนำร่องพื้นที่ TPE Site#1  
Date Analysis Commenced Apr 05, 2024  
Condition of Sample Contained in four glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
Chloride as Cl	mg/L	0.5	1	180	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (D)	Rayong
Total Organic Carbon	mg/L	0.01	0.1	11.4	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

**Guideline** : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By** : Paramet Sattayakun , Korbundit Kitsupavanit

Remark :

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Approved by

N. Banongkit

Narumon Banchongkit  
Supervisor

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Thailand 21150  
P/O : PMM-23-11  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1

TESTING  
No.0042

Lot ID: 2429702  
Date Received : Apr 05, 2024  
Date Reported : Apr 13, 2024  
Report Number : 2937960-1

Page 1 of 2

Sample Number 2429702-1  
Sampled Date Apr 05, 2024 10:49 AM  
Sample Description Wastewater  
Location Final Check Pond โรงงาน LDPE  
Date Analysis Commenced Apr 05, 2024  
Condition of Sample Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	5.4	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	34	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	<5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C	-	-	-	7.4	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	34.4	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	372	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	28	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banongkit

Narumon Banchongkit  
Supervisor  
โทรศัพท์ ๖-323-๙-๙445

Approved by

D. Chanchon

Dej Chanchon  
Senior Manager  
โทรศัพท์ ๖-323-๙-๙442

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## Analysis / Test Report

**Client :** Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
**P/O :** PMM-23-11  
**Project Name :** Environmental Monitoring  
**Project Location :** TPE Site 1



**TESTING**  
**No.0042**  
**Lot ID: 2429702**  
**Date Received :** Apr 05, 2024  
**Date Reported :** Apr 13, 2024  
**Report Number :** 2937960-1

Page 2 of 2

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).  
**Sampling By :** Paramet Sattayakun ทะเบียนเลขที่ ร-323-ก-9476 , Kadbundit Kitisupavanit ทะเบียนเลขที่ ร-204-ก-0001

**Remark :**

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## Analysis / Test Report

**Client :** Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
**P/O :** PMM-23-11  
**Project Name :** Environmental Monitoring  
**Project Location :** TPE Site 1

**Lot ID: 2429702**  
**Date Received :** Apr 05, 2024  
**Date Reported :** Apr 13, 2024  
**Report Number :** 2937960-2

Page 1 of 1

<b>Sample Number</b>	2429702-1						
<b>Sampled Date</b>	Apr 05, 2024 10:49 AM						
<b>Sample Description</b>	Wastewater						
<b>Location</b>	Final Check Pond ของโรงงาน LDPE						
<b>Date Analysis Commenced</b>	Apr 05, 2024						
<b>Condition of Sample</b>	Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
<b>Analyte</b>	<b>Unit</b>	<b>LOD</b>	<b>LOQ (LOR)</b>	<b>Result</b>	<b>Guideline / Specification</b>	<b>Method</b>	<b>Testing Location</b>
<b>Water Testing</b>							
Chloride as Cl	mg/L	0.5	1	136	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (D)	Rayong
Total Organic Carbon	mg/L	0.01	0.1	7.77	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).  
**Sampling By :** Paramet Sattayakun , Kadbundit Kitisupavanit

**Remark :**

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Technical Management

N. Banongkit

Narumon Banchongkit  
Supervisor  
ทะเบียนเลขที่ ร-323-ก-9445

Approved by

D. Changchon

Dej Changchon  
Senior Manager  
ทะเบียนเลขที่ ร-323-ก-9442

Approved by

N. Banongkit

Narumon Banchongkit  
Supervisor

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## Analysis / Test Report



TESTING  
No.0042

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand  
21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2444068

Date Received : May 16, 2024

Date Reported : May 24, 2024

Report Number : 2969756-1

Page 1 of 1

Sample Number	2444068-1					
Sampled Date	May 16, 2024 3:01 PM					
Sample Description	Wastewater					
Location	บ่อพักน้ำทิ้งรวมของอาคารสำนักงานในพื้นที่ TPE Site#1					
Date Analysis Commenced	May 16, 2024					
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)					

Analyte	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
<b>Water Testing</b>						
BOD (5 days at 20 Degree C)	mg/L	-	2.0	221	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
Oil & Grease	mg/L	-	3	10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Sulfide *	mg/L	-	0.5	5.8	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (C, F)	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	568	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	80.9	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	86	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Sampling By : Surawit Narapong ทะเบียนเลขที่ ๖-323-๖-0011

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Technical Management

**Photchana S.**

Photchana Seeda  
Scientist (4)

ทะเบียนเลขที่ ๖-323-๖-9446

Approved by

**D. Chongchon**

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ๖-323-๖-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand  
21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2444068

Date Received : May 16, 2024

Date Reported : May 24, 2024

Report Number : 2969756-2

Page 1 of 1

Sample Number	2444068-1					
Sampled Date	May 16, 2024 3:01 PM					
Sample Description	Wastewater					
Location	บ่อพักน้ำทิ้งรวมของอาคารสำนักงานในพื้นที่ TPE Site#1					
Date Analysis Commenced	May 18, 2024					
Condition of Sample	Contained in one amber glass bottle and five plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)					

Analyte	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
<b>Water Testing</b>						
Settleable Solid	mL/L/hr	-	0.1	0.4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 F	Rayong

Sampling By : Surawit Narapong

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

**Photchana S.**

Photchana Seeda  
Scientist (4)

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
P/O : PMM-23-11  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1



TESTING  
No.0042  
Lot ID: 2444075  
Date Received : May 23, 2024  
Date Reported : May 31, 2024  
Report Number : 2969771-1

Page 1 of 2

Sample Number	2444075-1
Sampled Date	May 23, 2024 11:02 AM
Sample Description	Wastewater
Location	หลักรับ API Separator ของโรงงาน HDPE#1
Date Analysis Commenced	May 23, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	<5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	<5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.6	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	31.6	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	43	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

Chontichak

Chonticha Subongkoch  
Scientist (3)  
โทร 09-00000000 0-323-0-9449

Approved by

D. Chonson

Dej Changchon  
Senior Manager  
โทร 09-00000000 0-323-0-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
P/O : PMM-23-11  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1



TESTING  
No.0042  
Lot ID: 2444075  
Date Received : May 23, 2024  
Date Reported : May 31, 2024  
Report Number : 2969771-1

Page 2 of 2

**Guideline** : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).  
**Sampling By** : Wanlop Hunchainaw โทร 09-00000000 0-323-0-9457 , Kardbundit Kitisupavanit โทร 09-00000000 0-204-0-0001

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak

Chonticha Subongkoch  
Scientist (3)  
โทร 09-00000000 0-323-0-9449

Approved by

D. Chonson

Dej Changchon  
Senior Manager  
โทร 09-00000000 0-323-0-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
P/O : PMM-23-11  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1

Lot ID: 2444075  
Date Received : May 23, 2024  
Date Reported : May 30, 2024  
Report Number : 2969771-2

Page 1 of 1

Sample Number	2444075-1
Sampled Date	May 23, 2024 11:02 AM
Sample Description	Wastewater
Location	หลังคา API Separator ของโรงงาน HDPE#1
Date Analysis Commenced	May 24, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
n-Hexane	mg/L	-	0.001	0.06	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).  
**Sampling By :** Wanlop Hunchanaow , Kardbundit Kitisupavanit

Remark :  
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

Siriluk P.  
Siriluk Bunnak  
Section Head

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## Analysis / Test Report

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Thailand 21150  
P/O : PMM-23-11  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1



TESTING  
No.0042  
Lot ID: 2444080  
Date Received : May 16, 2024  
Date Reported : May 25, 2024  
Report Number : 2969777-1

Page 1 of 2

Sample Number	2444080-1
Sampled Date	May 16, 2024 2:40 PM
Sample Description	Wastewater
Location	โรงบำบัดน้ำทิ้ง TPE Site#1
Date Analysis Commenced	May 16, 2024
Condition of Sample	Contained in four glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	3.8	≤20	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	36	≤120	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	11	≤300	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	11	≤300	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.6	5.5-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	33.3	≤40	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	644	≤3000	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	29	≤50	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

Chontichak  
Chonticha Subongkoch  
Scientist (3)  
ทะเบียนเลขที่ 7-323-ก-9449

Approved by

Dej Changchon  
Senior Manager  
ทะเบียนเลขที่ 7-323-ก-9442

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## Analysis / Test Report

**Client :** Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
**P/O :** PMM-23-11  
**Project Name :** Environmental Monitoring  
**Project Location :** TPE Site 1

**TESTING**  
**No.0042**  
**Lot ID: 2444080**  
Date Received : May 16, 2024  
Date Reported : May 25, 2024  
Report Number : 2969777-1



Page 2 of 2

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).  
**Sampling By :** Surawit Narapong ทะเบียนเลขที่ ๖-323-๖-0011 , Thanasoun Namakunna ทะเบียนเลขที่ ๖-204-๖-0101

**Remark :**  
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)  
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.  
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## Analysis / Test Report

**Client :** Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
**P/O :** PMM-23-11  
**Project Name :** Environmental Monitoring  
**Project Location :** TPE Site 1

**Lot ID: 2444080**  
Date Received : May 16, 2024  
Date Reported : May 25, 2024  
Report Number : 2969777-2

Page 1 of 1

**Sample Number** 2444080-1  
**Sampled Date** May 16, 2024 2:40 PM  
**Sample Description** Wastewater  
**Location** โรงระเหยน้ำรวมพื้นที่ TPE Site#1  
**Date Analysis Commenced** May 16, 2024  
**Condition of Sample** Contained in four glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
Chloride as Cl	mg/L	0.5	1	179	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (D)	Rayong
Total Organic Carbon	mg/L	0.01	0.1	10.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).  
**Sampling By :** Surawit Narapong , Thanasoun Namakunna

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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Technical Management

Chontichak

Chonticha Subongkoch  
Scientist (3)  
ทะเบียนเลขที่ ๖-323-๖-9449

Approved by

D. Changchon

Dej Changchon  
Senior Manager  
ทะเบียนเลขที่ ๖-323-๖-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1



TESTING  
No.0042  
Lot ID: 2444084

Date Received : May 16, 2024

Date Reported : Jun 10, 2024

Report Number : 3018897-1

Page 1 of 2

Sample Number	2444084-1
Sampled Date	May 16, 2024 2:31 PM
Sample Description	Wastewater
Location	Final Check Pond บึงตรวจน้ำ LDPE
Date Analysis Commenced	May 16, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.4	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	35.4	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	504	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Surawit Narapong ทะเบียนเลขที่ ร-323-ก-0011 , Thanasoun Namakunna ทะเบียนเลขที่ ร-204-ก-0101

Technical Management

**Photchana S.**

Photchana Seeda  
Scientist (4)  
ทะเบียนเลขที่ ร-323-ก-9446

Approved by

**D. Chumon.**

Dej Changchon  
Senior Manager  
ทะเบียนเลขที่ ร-323-ก-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1



TESTING  
No.0042  
Lot ID: 2444084

Date Received : May 16, 2024

Date Reported : Jun 10, 2024

Report Number : 3018897-1

Page 2 of 2

Remark :  
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- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.  
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

**Photchana S.**

Photchana Seeda  
Scientist (4)  
ทะเบียนเลขที่ ร-323-ก-9446

Approved by

**D. Chumon.**

Dej Changchon  
Senior Manager  
ทะเบียนเลขที่ ร-323-ก-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
P/O : PMM-23-11  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1

Lot ID: 2444084  
Date Received : May 16, 2024  
Date Reported : Jun 10, 2024  
Report Number : 3018897-2

Page 1 of 1

Sample Number	2444084-1
Sampled Date	May 16, 2024 2:31 PM
Sample Description	Wastewater
Location	Final Check Pond ของโรงงาน LDPE
Date Analysis Commenced	May 16, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
Chloride as Cl	mg/L	0.5	1	156	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (D)	Rayong
Flow rate	m3/s	-	-	0.031	No Standard	Flow meter	Rayong
Total Organic Carbon	mg/L	0.01	0.1	7.50	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Surawit Narapong , Thanasoun Namakunna

**Remark :**

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

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Approved by

Photchana S.

Photchana Seeda  
Scientist (4)

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O :  
Project Name : Environmental Monitoring  
Project Location :



TESTING

No.0042

Lot ID: 2461905  
Date Received : May 31, 2024  
Date Reported : Jun 06, 2024  
Report Number : 3008734-1

Page 1 of 1

Sample Number	2461905-1
Sampled Date	May 31, 2024 8:30 AM
Sample Description	Wastewater
Location	Final Check Pond ของโรงงาน LDPE
Date Analysis Commenced	Jun 01, 2024
Condition of Sample	Contained in one plastic bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	9	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Wanlop Hunchainaw ทนเบี่ยนเลขที่ 3-323-จ-9457 , Chainusorn Lertnanthakunchai ทนเบี่ยนเลขที่ 3-323-จ-9461

**Remark :**

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Photchana S.

Photchana Seeda  
Scientist (4)  
ทนเบี่ยนเลขที่ 3-323-จ-9446

Approved by

Dej Changchon

Senior Manager  
ทนเบี่ยนเลขที่ 3-323-จ-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand  
21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2460077

Date Received : Jun 07, 2024

Date Reported : Jun 14, 2024

Report Number : 3004541-1



TESTING  
No.0042

Sample Number	2460077-1					
Sampled Date	Jun 07, 2024 11:35 AM					
Sample Description	Wastewater					
Location	บ่อพักน้ำทิ้งรวมของอาคารสำนักงานในพื้นที่ TPE Site#1					
Date Analysis Commenced	Jun 07, 2024					
Condition of Sample	Contained in one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)					
Analyte	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
Water Testing						
BOD (5 days at 20 Degree C)	mg/L	-	2.0	220	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
Oil & Grease	mg/L	-	3	4	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Sulfide *	mg/L	-	0.5	5.3	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (C, F)	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	588	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	115	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	63	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Sampling By : Paramet Sattayakun ทะเบียนเลขที่ ๖-323-๙-9476

Remark :

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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
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Technical Management

Chontichak

Chonticha Subongkoch  
Scientist (3)

ทะเบียนเลขที่ ๖-323-๙-9449

Approved by

D. Changchon

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ๖-323-๙-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand  
21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2460077

Date Received : Jun 07, 2024

Date Reported : Jun 14, 2024

Report Number : 3004541-2

Sample Number	2460077-1					
Sampled Date	Jun 07, 2024 11:35 AM					
Sample Description	Wastewater					
Location	บ่อพักน้ำทิ้งรวมของอาคารสำนักงานในพื้นที่ TPE Site#1					
Date Analysis Commenced	Jun 08, 2024					
Condition of Sample	Contained in one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)					
Analyte	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
Water Testing						
Settleable Solid	mL/L/hr	-	0.1	<0.1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 F	Rayong

Sampling By : Paramet Sattayakun

Remark :

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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location: TPE Site 1



TESTING

No.0042

Lot ID: 2460078

Date Received : Jun 07, 2024

Date Reported : Jun 14, 2024

Report Number : 3004542-1

Page 1 of 2

Sample Number	2460078-1						
Sampled Date	Jun 07, 2024 11:50 AM						
Sample Description	Wastewater						
Location	หลังบ้าน API Separator ของโรงงาน HDPE#1						
Date Analysis Commenced	Jun 07, 2024						
Condition of Sample	Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	26	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	<5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	<5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.4	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	38.2	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	116	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	31	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

**Chontichak**

Chonticha Subongkoch

Scientist (3)

ทะเบียนเลขที่ 7-323-ก-9449

Approved by

**D. Chonson**

Dej Changchon

Senior Manager

ทะเบียนเลขที่ 7-323-ก-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location: TPE Site 1



TESTING

No.0042

Lot ID: 2460078

Date Received : Jun 07, 2024

Date Reported : Jun 14, 2024

Report Number : 3004542-1

Page 2 of 2

**Guideline** : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).  
**Sampling By** : Paramet Sattayakun ทะเบียนเลขที่ 7-323-ก-9476 , Pattarapol Sawangjaitam ทะเบียนเลขที่ 7-204-ก-0002

Remark :

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Technical Management

**Chontichak**

Chonticha Subongkoch

Scientist (3)

ทะเบียนเลขที่ 7-323-ก-9449

Approved by

**D. Chonson**

Dej Changchon

Senior Manager

ทะเบียนเลขที่ 7-323-ก-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
P/O : PMM-23-11  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1

Lot ID: 2460078  
Date Received : Jun 07, 2024  
Date Reported : Jun 15, 2024  
Report Number : 3004542-2

Page 1 of 1

Sample Number	2460078-1
Sampled Date	Jun 07, 2024 11:50 AM
Sample Description	Wastewater
Location	หลังบ้าน API Separator ของโรงงาน HDPE#1
Date Analysis Commenced	Jun 10, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
n-Hexane	mg/L	--	0.001	0.25	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Paramet Sattayakun , Pattarapol Sawangjaitam

Remark :  
- LOD : Limit of Detection  
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

*Suwimon C.*

Suwimon Chairuangwut  
Scientist (3)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197  
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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
P/O : PMM-23-11  
Project Name : Environmental Monitoring  
Project Location : TPE Site 1



TESTING

No.0042

Lot ID: 2460079  
Date Received : Jun 07, 2024  
Date Reported : Jun 14, 2024  
Report Number : 3004543-1

Page 1 of 2

Sample Number	2460079-1
Sampled Date	Jun 07, 2024 11:30 AM
Sample Description	Wastewater
Location	บริเวณหน้าโรงงาน TPE Site#1
Date Analysis Commenced	Jun 07, 2024
Condition of Sample	Contained in four glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	31	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	13	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	11	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.9	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	38.6	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	428	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	11	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

*Chontichak*

Chonticha Subongkoch  
Scientist (3)  
ทะเบียนเลขที่ 7-323-4-9449

Approved by

*D. Changchon*

Dej Changchon  
Senior Manager  
ทะเบียนเลขที่ 7-323-4-9442

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## Analysis / Test Report

**Client :** Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
**P/O :** PMM-23-11  
**Project Name :** Environmental Monitoring  
**Project Location :** TPE Site 1



**TESTING**  
**No.0042**  
**Lot ID: 2460079**  
Date Received : Jun 07, 2024  
Date Reported : Jun 14, 2024  
Report Number : 3004543-1

Page 2 of 2

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).  
**Sampling By :** Paramet Sattayakun ทะเบียนเลขที่ 7-323-ก-9476 , Pattarapol Sawangjaitam ทะเบียนเลขที่ 7-204-ก-0002

**Remark :**

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- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.



## Analysis / Test Report

**Client :** Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
**P/O :** PMM-23-11  
**Project Name :** Environmental Monitoring  
**Project Location :** TPE Site 1

**Lot ID: 2460079**  
Date Received : Jun 07, 2024  
Date Reported : Jun 15, 2024  
Report Number : 3004543-2

Page 1 of 1

<b>Sample Number</b>	2460079-1						
<b>Sampled Date</b>	Jun 07, 2024 11:30 AM						
<b>Sample Description</b>	Wastewater						
<b>Location</b>	วางรณภณำรณพ่นที่ TPE Site#1						
<b>Date Analysis Commenced</b>	Jun 07, 2024						
<b>Condition of Sample</b>	Contained in four glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
<b>Analyte</b>	<b>Unit</b>	<b>LOD</b>	<b>LOQ (LOR)</b>	<b>Result</b>	<b>Guideline / Specification</b>	<b>Method</b>	<b>Testing Location</b>
<b>Water Testing</b>							
Chloride as Cl	mg/L	0.5	1	118	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (D)	Rayong
Flow rate	m3/s	-	-	0.016	No Standard	Flow meter	Rayong
n-Hexane	mg/L	-	0.001	<0.001	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Total Organic Carbon	mg/L	0.01	0.1	10.1	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).  
**Sampling By :** Paramet Sattayakun , Pattarapol Sawangjaitam

**Remark :**

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Technical Management

*Chontichak*

Chonticha Subongkoch  
Scientist (3)  
ทะเบียนเลขที่ 7-323-ก-9449

Approved by

*D. Changchon*

Dej Changchon  
Senior Manager  
ทะเบียนเลขที่ 7-323-ก-9442

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Approved by

*Suwimon C.*

Suwimon Chainuangwut  
Scientist (3)

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1



TESTING

No.0042

Lot ID: 2460080

Date Received : Jun 07, 2024

Date Reported : Jun 14, 2024

Report Number : 3004544-1

Page 1 of 2

Sample Number	2460080-1
Sampled Date	Jun 07, 2024 11:13 AM
Sample Description	Wastewater
Location	Final Check Pond ของโรงงาน LDPE
Date Analysis Commenced	Jun 07, 2024
Condition of Sample	Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	6	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.4	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	39.5	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	124	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	13	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

**Chontichak**

Chonticha Subongkoch  
Scientist (3)

โทรศัพท์ ๖-323-๙-9449

Approved by

**D. Chuan**

Dej Changchon  
Senior Manager

โทรศัพท์ ๖-323-๙-9442

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1



TESTING

No.0042

Lot ID: 2460080

Date Received : Jun 07, 2024

Date Reported : Jun 14, 2024

Report Number : 3004544-1

Page 2 of 2

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).  
**Sampling By :** Paramet Sattayakun ทะเบียนเลขที่ ๖-323-๙-9476 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ๖-204-๙-0002

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

**Chontichak**

Chonticha Subongkoch  
Scientist (3)

โทรศัพท์ ๖-323-๙-9449

Approved by

**D. Chuan**

Dej Changchon  
Senior Manager

โทรศัพท์ ๖-323-๙-9442

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## Analysis / Test Report

**Client :** Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
**P/O :** PMM-23-11  
**Project Name :** Environmental Monitoring  
**Project Location:** TPE Site 1

**Lot ID: 2460080**  
**Date Received :** Jun 07, 2024  
**Date Reported :** Jun 15, 2024  
**Report Number :** 3004544-2

Page 1 of 1

**Sample Number** 2460080-1  
**Sampled Date** Jun 07, 2024 11:13 AM  
**Sample Description** Wastewater  
**Location** Final Check Pond บ่อตรวจงาน LDPE  
**Date Analysis Commenced** Jun 07, 2024  
**Condition of Sample** Contained in two glass vials, one amber glass bottle and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Water Testing</b>							
Chloride as Cl	mg/L	0.5	1	60	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (D)	Rayong
Flow rate	m <sup>3</sup> /s	-	-	0.002	No Standard	Flow meter	Rayong
Total Organic Carbon	mg/L	0.01	0.1	3.28	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Paramet Sattayakun , Pattarapol Sawangjaitam

**Remark :**  
- LOD : Limit of Detection  
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

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Approved by

*Suwimon C.*  
Suwimon Chairuangwut  
Scientist (3)

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2411249

Date Received : May 23, 2024

Date Reported : May 31, 2024

Report Number : 2940577-2

Page 1 of 1

Sample Number	2411249-1						
Sampled Date	May 23, 2024 11:58 AM						
Sample Description	Groundwater						
Location	บ่อก่อนน้ำ						
Date Analysis Commenced	May 24, 2024						
Condition of Sample	Contained in two glass vials, two amber glass bottles and one plastic bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Organic Compounds</b>							
n-Hexane	mg/L	-	0.001	<0.001	11	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
<b>Petroleum Hydrocarbons</b>							
TPH C>16-C35	mg/L	-	0.05	<0.05	0.1	United States Environmental Protection Agency, EPA Method 3510 C and 8015 C	Bangkok
TPH C>8-C16	mg/L	-	0.05	<0.05	1.7	United States Environmental Protection Agency, EPA Method 3510 C and 8015 C	Bangkok
TPH C5-C8	mg/L	-	0.01	<0.01	1.4	United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok

**Guideline :** Notification of the Ministry of Industry B.E. 2559 (2016) on Soil and Groundwater Contamination Criteria, Monitoring of Soil and Groundwater Quality, Report Submission and Report Preparation of Soil and Groundwater Quality, and Proposal Report of Soil and Groundwater Controlling and Reduction Measures

**Note :** TPH C5-C8: Sum of n-Pentane, n-Hexane, n-Heptane and n-Octane  
TPH C>8-C16: Sum of n-Nonane, n-Decane, n-Undecane, n-Dodecane, n-Tridecane, n-Tetradecane, n-Pentadecane and n-Hexadecane  
TPH C>16-C35: Sum of n-Heptadecane, Pristane, n-Octadecane, Phytane, n-Nonadecane, n-Eicosane, n-Heneicosane, n-Docosane, n-Tricosane, n-Tetracosane, n-Pentacosane, n-Hexacosane, n-Heptacosane, n-Octacosane, n-Nonacosane, n-Triacontane, n-Hentriacontane, n-Dotriacontane, n-Tritriacontane, n-Tetracontane and n-Pentatriacontane  
Integration mode: Peak to Peak

**Sampling By :** Wanlop Hunchanaoow ทะเบียนเลขที่ ๖-323-๖-9457 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ๖-204-๖-0001

Remark :

- LOD : Limit of Detection
- < : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Technical Management

*Suwimon C.*

Suwimon Chairuangwut  
Scientist (3)  
ทะเบียนเลขที่ ๖-204-๖-0018

Approved by

*Kanokorn Anek*

Kanokorn Anek  
Senior Manager  
ทะเบียนเลขที่ ๖-204-๖-0004

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : LLDPE

Lot ID: 2430848

Date Received : May 23, 2024

Date Reported : May 30, 2024

Report Number : 2940585-2

Page 1 of 1

Sample Number	2430848-1						
Sampled Date	May 23, 2024 10:26 AM						
Sample Description	Groundwater						
Location	บ่อก่อนน้ำ						
Date Analysis Commenced	May 24, 2024						
Condition of Sample	Contained in two glass vials, two amber glass bottles and one plastic bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Organic Compounds</b>							
n-Hexane	mg/L	-	0.001	<0.001	11	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
<b>Petroleum Hydrocarbons</b>							
TPH C>16-C35	mg/L	-	0.05	<0.05	0.1	United States Environmental Protection Agency, EPA Method 3510 C and 8015 C	Bangkok
TPH C>8-C16	mg/L	-	0.05	<0.05	1.7	United States Environmental Protection Agency, EPA Method 3510 C and 8015 C	Bangkok
TPH C5-C8	mg/L	-	0.01	<0.01	1.4	United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok

**Guideline :** Notification of the Ministry of Industry B.E. 2559 (2016) on Soil and Groundwater Contamination Criteria, Monitoring of Soil and Groundwater Quality, Report Submission and Report Preparation of Soil and Groundwater Quality, and Proposal Report of Soil and Groundwater Controlling and Reduction Measures

**Note :** TPH C5-C8: Sum of n-Pentane, n-Hexane, n-Heptane and n-Octane  
TPH C>8-C16: Sum of n-Nonane, n-Decane, n-Undecane, n-Dodecane, n-Tridecane, n-Tetradecane, n-Pentadecane and n-Hexadecane  
TPH C>16-C35: Sum of n-Heptadecane, Pristane, n-Octadecane, Phytane, n-Nonadecane, n-Eicosane, n-Heneicosane, n-Docosane, n-Tricosane, n-Tetracosane, n-Pentacosane, n-Hexacosane, n-Heptacosane, n-Octacosane, n-Nonacosane, n-Triacontane, n-Hentriacontane, n-Dotriacontane, n-Tritriacontane, n-Tetracontane and n-Pentatriacontane  
Integration mode: Peak to Peak

**Sampling By :** Wanlop Hunchanaoow ทะเบียนเลขที่ ๖-323-๖-9457 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ๖-204-๖-0001

Remark :

- LOD : Limit of Detection
- < : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Technical Management

*Siriluk P.*

Siriluk Bunnak  
Section Head  
ทะเบียนเลขที่ ๖-204-๖-0013

Approved by

*Kanokorn Anek*

Kanokorn Anek  
Senior Manager  
ทะเบียนเลขที่ ๖-204-๖-0004

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2429698

Date Received : May 23, 2024

Date Reported : May 30, 2024

Report Number : 3007532-2

Page 1 of 1

Sample Number	2429698-1						
Sampled Date	May 23, 2024 12:31 PM						
Sample Description	Groundwater						
Location	บ่ออ้างอิง 1						
Date Analysis Commenced	May 24, 2024						
Condition of Sample	Contained in two glass vials, two amber glass bottles and one plastic bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Organic Compounds</b>							
n-Hexane	mg/L	-	0.001	<0.001	11	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
<b>Petroleum Hydrocarbons</b>							
TPH C>16-C35	mg/L	-	0.05	<0.05	0.1	United States Environmental Protection Agency, EPA Method 3510 C and 8015 C	Bangkok
TPH C>8-C16	mg/L	-	0.05	<0.05	1.7	United States Environmental Protection Agency, EPA Method 3510 C and 8015 C	Bangkok
TPH C5-C8	mg/L	-	0.01	<0.01	1.4	United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok

**Guideline :** Notification of the Ministry of Industry B.E. 2559 (2016) on Soil and Groundwater Contamination Criteria, Monitoring of Soil and Groundwater Quality, Report Submission and Report Preparation of Soil and Groundwater Quality, and Proposal Report of Soil and Groundwater Controlling and Reduction Measures

(1): ในกรณีที่มีการปนเปื้อนของกรดหรือด่างไปเปรียบเทียบกับค่าพีเอชจากจุดเก็บตัวอย่างบ่อน้ำที่ใช้ในการติดตามตรวจสอบการปนเปื้อนกับค่าพีเอชจากจุดเก็บตัวอย่างบ่อน้ำที่ไม่เป็นบ่ออ้างอิงบนทิศทางการไหลของน้ำใต้ดินในพื้นที่ โดยค่าพีเอชที่เปลี่ยนแปลงจะไม่เกินหนึ่งระดับ และไม่อยู่ในช่วงค่าเกณฑ์อนุญาตโดยสูงสุดของมาตรฐานคุณภาพน้ำบาดาลที่ไทยมีค่าคือ 6.5-9.2

**Note :** TPH C5-C8: Sum of n-Pentane, n-Hexane, n-Heptane and n-Octane  
TPH C>8-C16: Sum of n-Nonane, n-Decane, n-Undecane, n-Dodecane, n-Tridecane, n-Tetradecane, n-Pentadecane and n-Hexadecane  
TPH C>16-C35: Sum of n-Heptadecane, Pristane, n-Octadecane, Phytane, n-Nonadecane, n-Eicosane, n-Heneicosane, n-Docosane, n-Tricosane, n-Tetracosane, n-Pentacosane, n-Hexacosane, n-Heptacosane, n-Octacosane, n-Nonacosane, n-Triacontane, n-Hentriacontane, n-Dotriacontane, n-Tritriacontane, n-Tetatriacontane and n-Pentatriacontane  
Integration mode: Peak to Peak

**Sampling By :** Wanlop Hunchainao ระเบียบเลขที่ ว-323-จ-9457 , Kardbundit Kitisupavanit ระเบียบเลขที่ ว-204-จ-0001

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Technical Management

Siriluk P.

Siriluk Bunnak  
Section Head

ระเบียบเลขที่ ว-204-จ-0013

Approved by

Kanokkorn Anek

Kanokkorn Anek  
Senior Manager

ระเบียบเลขที่ ว-204-จ-0004

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2429698

Date Received : May 23, 2024

Date Reported : May 30, 2024

Report Number : 3007533-2

Page 1 of 1

Sample Number	2429698-2						
Sampled Date	May 23, 2024 11:12 AM						
Sample Description	Groundwater						
Location	บ่ออ้างอิง 2						
Date Analysis Commenced	May 24, 2024						
Condition of Sample	Contained in two glass vials, two amber glass bottles and one plastic bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Organic Compounds</b>							
n-Hexane	mg/L	-	0.001	<0.001	11	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
<b>Petroleum Hydrocarbons</b>							
TPH C>16-C35	mg/L	-	0.05	<0.05	0.1	United States Environmental Protection Agency, EPA Method 3510 C and 8015 C	Bangkok
TPH C>8-C16	mg/L	-	0.05	<0.05	1.7	United States Environmental Protection Agency, EPA Method 3510 C and 8015 C	Bangkok
TPH C5-C8	mg/L	-	0.01	<0.01	1.4	United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok

**Guideline :** Notification of the Ministry of Industry B.E. 2559 (2016) on Soil and Groundwater Contamination Criteria, Monitoring of Soil and Groundwater Quality, Report Submission and Report Preparation of Soil and Groundwater Quality, and Proposal Report of Soil and Groundwater Controlling and Reduction Measures

**Note :** TPH C5-C8: Sum of n-Pentane, n-Hexane, n-Heptane and n-Octane  
TPH C>8-C16: Sum of n-Nonane, n-Decane, n-Undecane, n-Dodecane, n-Tridecane, n-Tetradecane, n-Pentadecane and n-Hexadecane  
TPH C>16-C35: Sum of n-Heptadecane, Pristane, n-Octadecane, Phytane, n-Nonadecane, n-Eicosane, n-Heneicosane, n-Docosane, n-Tricosane, n-Tetracosane, n-Pentacosane, n-Hexacosane, n-Heptacosane, n-Octacosane, n-Nonacosane, n-Triacontane, n-Hentriacontane, n-Dotriacontane, n-Tritriacontane, n-Tetatriacontane and n-Pentatriacontane  
Integration mode: Peak to Peak

**Sampling By :** Wanlop Hunchainao ระเบียบเลขที่ ว-323-จ-9457 , Kardbundit Kitisupavanit ระเบียบเลขที่ ว-204-จ-0001

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Technical Management

Siriluk P.

Siriluk Bunnak  
Section Head

ระเบียบเลขที่ ว-204-จ-0013

Approved by

Kanokkorn Anek

Kanokkorn Anek  
Senior Manager

ระเบียบเลขที่ ว-204-จ-0004

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## Analysis / Test Report



TESTING  
No.0042

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2444056

Date Received : May 29, 2024

Date Reported : Jun 01, 2024

Report Number: 3010685-1

Page 1 of 1

Sample Number 2444056-1  
Parameter Noise (Leq 24 hrs.)  
Location อาคารสำนักงานของกรมโรงงาน TPE Site#1 (GPS 47P 0731760, 1404872)  
Measurement Date May 13 - May 14, 2024  
Measurement by Anuwet Tema  
Sound Level meter Serial No. 233183

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	61.0	89.3	58.8
11:00 AM - 12:00 PM	60.7	82.1	58.2
12:00 PM - 01:00 PM	60.7	83.4	58.4
01:00 PM - 02:00 PM	60.5	76.3	58.4
02:00 PM - 03:00 PM	60.6	81.1	58.6
03:00 PM - 04:00 PM	61.7	77.3	59.7
04:00 PM - 05:00 PM	62.8	74.9	61.3
05:00 PM - 06:00 PM	62.0	79.9	60.1
06:00 PM - 07:00 PM	61.9	81.8	60.3
07:00 PM - 08:00 PM	61.5	70.9	59.5
08:00 PM - 09:00 PM	60.7	70.5	58.5
09:00 PM - 10:00 PM	61.2	77.2	59.2
10:00 PM - 11:00 PM	62.3	76.5	60.9
11:00 PM - 12:00 AM	61.4	74.1	59.7
12:00 AM - 01:00 AM	61.0	73.8	58.9
01:00 AM - 02:00 AM	61.3	83.3	59.0
02:00 AM - 03:00 AM	60.7	71.5	58.8
03:00 AM - 04:00 AM	60.8	68.8	59.2
04:00 AM - 05:00 AM	61.5	77.5	59.7
05:00 AM - 06:00 AM	63.0	85.0	60.9
06:00 AM - 07:00 AM	62.1	87.1	60.2
07:00 AM - 08:00 AM	62.0	78.4	59.8
08:00 AM - 09:00 AM	61.6	81.1	59.3
09:00 AM - 10:00 AM	61.3	81.1	59.0

Leq Average 24 hrs. (dB(A))

61.5

Lmax (dB(A))

89.3

L90 (dB(A))

59.2

Ldn (dB(A))

68.0

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการ  
โรงงาน พ.ศ. 2548

Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanita K.

Thanita Kulsuriwong  
Scientist (4)

Approved by

Supot S

Supot Salamteh  
Section Head

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556  
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S:\Reports\_Air Noise.rpt ( 1:19PM)



## Analysis / Test Report



TESTING  
No.0042

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2444056

Date Received : May 29, 2024

Date Reported : Jun 01, 2024

Report Number: 3010686-1

Page 1 of 1

Sample Number 2444056-2  
Parameter Noise (Leq 24 hrs.)  
Location อาคารสำนักงานของกรมโรงงาน TPE Site#1 (GPS 47P 0731760, 1404872)  
Measurement Date May 14 - May 15, 2024  
Measurement by Anuwet Tema  
Sound Level meter Serial No. 233183

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	61.0	82.3	58.9
11:00 AM - 12:00 PM	60.6	75.7	58.4
12:00 PM - 01:00 PM	60.8	75.7	58.6
01:00 PM - 02:00 PM	61.6	75.9	60.0
02:00 PM - 03:00 PM	60.9	81.0	58.3
03:00 PM - 04:00 PM	60.6	82.8	58.4
04:00 PM - 05:00 PM	60.6	81.8	57.9
05:00 PM - 06:00 PM	61.0	80.9	58.1
06:00 PM - 07:00 PM	61.0	80.4	58.6
07:00 PM - 08:00 PM	60.8	85.9	57.9
08:00 PM - 09:00 PM	61.2	81.8	58.4
09:00 PM - 10:00 PM	60.9	84.1	58.4
10:00 PM - 11:00 PM	60.2	77.2	57.7
11:00 PM - 12:00 AM	61.2	70.8	59.3
12:00 AM - 01:00 AM	59.9	70.4	57.7
01:00 AM - 02:00 AM	60.2	70.1	57.9
02:00 AM - 03:00 AM	59.8	75.6	57.5
03:00 AM - 04:00 AM	60.1	73.6	58.2
04:00 AM - 05:00 AM	60.3	75.3	57.7
05:00 AM - 06:00 AM	61.0	77.8	58.4
06:00 AM - 07:00 AM	61.2	81.5	58.6
07:00 AM - 08:00 AM	61.3	77.3	59.0
08:00 AM - 09:00 AM	61.9	82.4	59.1
09:00 AM - 10:00 AM	62.1	81.3	59.7

Leq Average 24 hrs. (dB(A))

60.9

Lmax (dB(A))

85.9

L90 (dB(A))

58.4

Ldn (dB(A))

67.0

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการ  
โรงงาน พ.ศ. 2548

Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanita K.

Thanita Kulsuriwong  
Scientist (4)

Approved by

Supot S

Supot Salamteh  
Section Head

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556  
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## Analysis / Test Report



TESTING  
No.0042

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2444056

Date Received : May 29, 2024

Date Reported : Jun 01, 2024

Report Number: 3010687-1

Page 1 of 1

Sample Number 2444056-3  
Parameter Noise (Leq 24 hrs.)  
Location อาคารสำนักงานของกลุ่มโรงงาน TPE Site#1 (GPS 47P 0731760, 1404872)  
Measurement Date May 15 - May 16, 2024  
Measurement by Anuwet Tema  
Sound Level meter Serial No. 233183

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	60.9	79.3	58.3
11:00 AM - 12:00 PM	65.8	87.3	57.3
12:00 PM - 01:00 PM	59.7	77.5	57.5
01:00 PM - 02:00 PM	59.6	79.0	57.2
02:00 PM - 03:00 PM	60.2	78.6	57.9
03:00 PM - 04:00 PM	60.6	79.0	58.3
04:00 PM - 05:00 PM	61.4	80.3	59.6
05:00 PM - 06:00 PM	61.5	83.2	59.1
06:00 PM - 07:00 PM	61.0	80.5	58.8
07:00 PM - 08:00 PM	60.4	84.7	57.9
08:00 PM - 09:00 PM	62.1	83.0	59.6
09:00 PM - 10:00 PM	60.7	77.1	59.2
10:00 PM - 11:00 PM	61.6	78.1	60.0
11:00 PM - 12:00 AM	60.9	77.1	59.4
12:00 AM - 01:00 AM	61.2	88.2	59.3
01:00 AM - 02:00 AM	61.0	85.9	58.7
02:00 AM - 03:00 AM	60.5	76.5	59.1
03:00 AM - 04:00 AM	60.2	87.3	58.4
04:00 AM - 05:00 AM	60.2	73.7	58.9
05:00 AM - 06:00 AM	61.0	74.3	59.2
06:00 AM - 07:00 AM	61.4	86.7	59.5
07:00 AM - 08:00 AM	61.5	78.9	59.1
08:00 AM - 09:00 AM	60.8	77.9	58.6
09:00 AM - 10:00 AM	61.3	82.8	58.8

Leq Average 24 hrs. (dB(A))

61.3

Lmax (dB(A))

88.2

L90 (dB(A))

58.8

Ldn (dB(A))

67.4

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanita K.

Thanita Kulsuriwong  
Scientist (4)

Approved by

Supot S.

Supot Salamteh  
Section Head

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand PHONE +66 0 3304 8555 FAX +66 0 3304 8556  
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## Analysis / Test Report



TESTING  
No.0042

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2444056

Date Received : May 29, 2024

Date Reported : Jun 01, 2024

Report Number: 3010688-1

Page 1 of 1

Sample Number 2444056-4  
Parameter Noise (Leq 24 hrs.)  
Location อาคารสำนักงานของกลุ่มโรงงาน TPE Site#1 (GPS 47P 0731760, 1404872)  
Measurement Date May 16 - May 17, 2024  
Measurement by Anuwet Tema  
Sound Level meter Serial No. 233183

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	60.1	74.9	58.3
11:00 AM - 12:00 PM	60.2	72.4	58.4
12:00 PM - 01:00 PM	60.5	81.2	58.5
01:00 PM - 02:00 PM	63.7	80.1	62.5
02:00 PM - 03:00 PM	63.2	79.2	62.0
03:00 PM - 04:00 PM	63.6	78.8	62.4
04:00 PM - 05:00 PM	62.6	79.1	60.5
05:00 PM - 06:00 PM	61.4	79.7	59.1
06:00 PM - 07:00 PM	60.5	73.6	58.3
07:00 PM - 08:00 PM	60.2	83.3	58.2
08:00 PM - 09:00 PM	59.4	70.9	57.7
09:00 PM - 10:00 PM	60.1	69.2	58.6
10:00 PM - 11:00 PM	60.8	76.2	58.9
11:00 PM - 12:00 AM	62.1	70.2	60.6
12:00 AM - 01:00 AM	65.1	82.8	59.6
01:00 AM - 02:00 AM	60.0	74.3	58.3
02:00 AM - 03:00 AM	59.5	74.1	57.6
03:00 AM - 04:00 AM	59.8	68.0	58.7
04:00 AM - 05:00 AM	60.0	73.3	58.1
05:00 AM - 06:00 AM	61.6	82.9	59.7
06:00 AM - 07:00 AM	62.3	86.3	59.6
07:00 AM - 08:00 AM	61.5	74.8	59.3
08:00 AM - 09:00 AM	61.0	82.2	58.6
09:00 AM - 10:00 AM	60.9	81.2	57.8

Leq Average 24 hrs. (dB(A))

61.5

Lmax (dB(A))

86.3

L90 (dB(A))

58.6

Ldn (dB(A))

68.0

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanita K.

Thanita Kulsuriwong  
Scientist (4)

Approved by

Supot S.

Supot Salamteh  
Section Head

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand PHONE +66 0 3304 8555 FAX +66 0 3304 8556  
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## Analysis / Test Report



TESTING  
No.0042

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2444056

Date Received : May 29, 2024

Date Reported : Jun 01, 2024

Report Number: 3010689-1

Page 1 of 1

Sample Number 2444056-5  
Parameter Noise (Leq 24 hrs.)  
Location อาคารสำนักงานของกลุ่มโรงงาน TPE Site#1 (GPS 47P 0731760, 1404872)  
Measurement Date May 17 - May 18, 2024  
Measurement by Anuwet Tema  
Sound Level meter Serial No. 233183

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	59.7	79.1	57.1
11:00 AM - 12:00 PM	59.6	92.6	57.1
12:00 PM - 01:00 PM	59.9	81.0	57.2
01:00 PM - 02:00 PM	59.7	88.1	57.2
02:00 PM - 03:00 PM	60.7	84.6	58.3
03:00 PM - 04:00 PM	60.7	83.0	58.5
04:00 PM - 05:00 PM	60.7	77.9	58.6
05:00 PM - 06:00 PM	60.7	80.5	58.0
06:00 PM - 07:00 PM	60.2	76.2	58.2
07:00 PM - 08:00 PM	61.0	77.0	57.7
08:00 PM - 09:00 PM	60.2	72.7	58.3
09:00 PM - 10:00 PM	60.0	76.7	58.1
10:00 PM - 11:00 PM	60.4	78.4	58.8
11:00 PM - 12:00 AM	60.0	78.6	58.2
12:00 AM - 01:00 AM	59.8	69.9	58.5
01:00 AM - 02:00 AM	60.1	79.6	58.3
02:00 AM - 03:00 AM	59.8	78.5	58.1
03:00 AM - 04:00 AM	59.6	70.4	57.9
04:00 AM - 05:00 AM	60.7	76.5	58.7
05:00 AM - 06:00 AM	60.9	75.9	59.4
06:00 AM - 07:00 AM	60.8	75.3	58.8
07:00 AM - 08:00 AM	61.7	74.8	58.9
08:00 AM - 09:00 AM	61.8	82.7	59.1
09:00 AM - 10:00 AM	60.7	76.2	59.1

Leq Average 24 hrs. (dB(A))

60.4

Lmax (dB(A))

92.6

L90 (dB(A))

58.3

Ldn (dB(A))

66.7

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการ  
โรงงาน พ.ศ. 2548

Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanita K.

Thanita Kulsuriwong  
Scientist (4)

Approved by

Supot S.

Supot Salamteh  
Section Head

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556  
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## Analysis / Test Report



TESTING  
No.0042

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2444056

Date Received : May 29, 2024

Date Reported : Jun 01, 2024

Report Number: 3010690-1

Page 1 of 1

Sample Number 2444056-6  
Parameter Noise (Leq 24 hrs.)  
Location อาคารสำนักงานของกลุ่มโรงงาน TPE Site#1 (GPS 47P 0731760, 1404872)  
Measurement Date May 18 - May 19, 2024  
Measurement by Anuwet Tema  
Sound Level meter Serial No. 233183

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	60.3	77.4	58.3
11:00 AM - 12:00 PM	59.8	73.8	57.9
12:00 PM - 01:00 PM	60.4	78.1	57.1
01:00 PM - 02:00 PM	61.6	71.2	60.1
02:00 PM - 03:00 PM	60.3	77.0	57.6
03:00 PM - 04:00 PM	59.9	71.3	58.1
04:00 PM - 05:00 PM	60.1	72.3	58.0
05:00 PM - 06:00 PM	60.0	73.0	58.3
06:00 PM - 07:00 PM	59.8	72.8	58.1
07:00 PM - 08:00 PM	59.9	71.9	58.2
08:00 PM - 09:00 PM	59.8	72.9	58.3
09:00 PM - 10:00 PM	59.8	73.0	58.4
10:00 PM - 11:00 PM	60.1	73.5	58.8
11:00 PM - 12:00 AM	60.8	69.0	58.7
12:00 AM - 01:00 AM	60.4	68.9	57.7
01:00 AM - 02:00 AM	58.7	71.5	56.8
02:00 AM - 03:00 AM	58.9	70.5	57.3
03:00 AM - 04:00 AM	58.6	69.8	56.6
04:00 AM - 05:00 AM	58.9	71.4	57.1
05:00 AM - 06:00 AM	59.8	76.2	57.7
06:00 AM - 07:00 AM	60.9	80.2	58.3
07:00 AM - 08:00 AM	60.5	79.9	57.8
08:00 AM - 09:00 AM	60.1	76.5	57.6
09:00 AM - 10:00 AM	60.5	81.9	57.5

Leq Average 24 hrs. (dB(A))

60.1

Lmax (dB(A))

81.9

L90 (dB(A))

57.9

Ldn (dB(A))

66.2

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการ  
โรงงาน พ.ศ. 2548

Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanita K.

Thanita Kulsuriwong  
Scientist (4)

Approved by

Supot S.

Supot Salamteh  
Section Head

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556  
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## Analysis / Test Report



TESTING  
No.0042

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location : TPE Site 1

Lot ID: 2444056

Date Received : May 29, 2024

Date Reported : Jun 01, 2024

Report Number: 3010691-1

Page 1 of 1

Sample Number 2444056-7  
Parameter Noise (Leq 24 hrs.)  
Location อาคารสำนักงานของกลุ่มโรงงาน TPE Site#1 (GPS 47P 0731760, 1404872)  
Measurement Date May 19 - May 20, 2024  
Measurement by Anuwet Tema  
Sound Level meter Serial No. 233183

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	59.7	86.2	56.9
11:00 AM - 12:00 PM	59.9	81.1	56.7
12:00 PM - 01:00 PM	59.5	83.0	57.0
01:00 PM - 02:00 PM	59.7	85.6	56.8
02:00 PM - 03:00 PM	60.7	82.4	57.1
03:00 PM - 04:00 PM	60.0	70.5	58.1
04:00 PM - 05:00 PM	59.9	78.5	57.5
05:00 PM - 06:00 PM	59.9	84.5	57.5
06:00 PM - 07:00 PM	59.2	77.7	56.6
07:00 PM - 08:00 PM	59.6	85.1	57.2
08:00 PM - 09:00 PM	59.2	80.1	56.6
09:00 PM - 10:00 PM	59.1	75.2	57.0
10:00 PM - 11:00 PM	59.2	76.1	56.7
11:00 PM - 12:00 AM	59.3	75.5	57.1
12:00 AM - 01:00 AM	59.3	84.4	56.7
01:00 AM - 02:00 AM	59.8	71.5	58.0
02:00 AM - 03:00 AM	59.6	69.0	57.9
03:00 AM - 04:00 AM	59.7	68.9	58.4
04:00 AM - 05:00 AM	60.3	76.6	57.8
05:00 AM - 06:00 AM	61.6	77.0	59.7
06:00 AM - 07:00 AM	61.2	75.7	59.3
07:00 AM - 08:00 AM	61.2	83.9	58.1
08:00 AM - 09:00 AM	60.9	82.9	58.3
09:00 AM - 10:00 AM	60.0	74.0	57.9

Leq Average 24 hrs. (dB(A))

60.0

Lmax (dB(A))

86.2

L90 (dB(A))

57.2

Ldn (dB(A))

66.5

Standard (dB(A))

70

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanita K.

Thanita Kulsuriwong  
Scientist (4)

Approved by

Supot S.

Supot Salamteh  
Section Head

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand PHONE +66 0 3304 8555 FAX +66 0 3304 8556  
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## คุณภาพอากาศภายในสถานประกอบการ



## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location :

Lot ID: 247054

Date Received : Feb 02, 2024

Date Reported : Feb 13, 2024

Report Number : 2889749-1

Page 1 of 3

Sample Number 247054-1  
Sampled Date Feb 01, 2024  
Sample Description Air Quality  
Location ถนนพหลโยธิน C201 โรงงาน HDPE1  
Date Analysis Commenced Feb 03, 2024  
Condition of Sample Drawn into one 10-L air sampling bag  
Barometric Pressure 760 mmHg  
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Ethylene	10:15 AM - 12:15 PM	ppm	-	1.0	<1.0	200	Based on ASTM, D 2712-18	ACGIH	Bangkok

### Guideline :

ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2023).

Sampled By : Prasanmit Kueanpet

### Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

*Orawan R.*

Orawan Rakyong  
Scientist (3)

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of this report may be reproduced in any form without written consent from the laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location :

Lot ID: 247054

Date Received : Feb 02, 2024

Date Reported : Feb 13, 2024

Report Number : 2889749-1

Page 2 of 3

Sample Number 247054-2  
Sampled Date Feb 01, 2024  
Sample Description Air Quality  
Location ถนนพหลโยธิน C201 โรงงาน HDPE1  
Date Analysis Commenced Feb 05, 2024  
Condition of Sample Drawn into one sorbent tube, refrigerated  
Barometric Pressure 760 mmHg  
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
n-Hexane	10:15 AM - 12:15 PM	ppm	-	0.03	0.08	500		NIOSH (2003), 1500	MOL Bangkok

### Guideline :

MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)

Sampled By : Prasanmit Kueanpet

### Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

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Orawan Rakyong  
Scientist (3)

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

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Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location :

Lot ID: 247054

Date Received : Feb 02, 2024

Date Reported : Feb 13, 2024

Report Number : 2889749-1

Page 3 of 3

Sample Number	247054-3
Sampled Date	Feb 01, 2024
Sample Description	Air Quality
Location	หน่วยผลิต Catalyst D110 โรงงาน HDPE1
Date Analysis Commenced	Feb 05, 2024
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	760 mmHg
Atmospheric Temperature	32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
n-Hexane	10:15 AM - 12:15 PM	ppm	-	0.03	0.03	500	NIOSH (2003), 1500	MOL	Bangkok

### Guideline :

MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)

Sampled By : Prasarnmit Kueanpet

### Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location :

Lot ID: 2444061

Date Received : May 10, 2024

Date Reported : May 23, 2024

Report Number : 2969721-1

Page 1 of 3

Sample Number	2444061-1
Sampled Date	May 09, 2024
Sample Description	Air Quality
Location	หน่วยผลิต C201 โรงงาน HDPE1
Date Analysis Commenced	May 13, 2024
Condition of Sample	Drawn into one 10-L air sampling bag
Barometric Pressure	754 mmHg
Atmospheric Temperature	33.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Ethylene	09:00 AM - 11:00 AM	ppm	-	1.0	<1.0	200	Based on ASTM, D 2712-18	ACGIH	Bangkok

### Guideline :

ACGIH : The American Conference of Governmental Industrial Hygiene, The 6th edition of the Documentation of the Threshold Limit Values and Biological Exposure Indices (2023).

Sampled By : Norranon Tathongkham

### Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

*Orawan R.*

Orawan Rakyong  
Scientist (3)

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location :

Lot ID: 2444061

Date Received : May 10, 2024

Date Reported : May 23, 2024

Report Number : 2969721-1

Page 2 of 3

Sample Number 2444061-2  
Sampled Date May 09, 2024  
Sample Description Air Quality  
Location พหลพลพยุหเสนา C201 โรงงาน HDPE1  
Date Analysis Commenced May 11, 2024  
Condition of Sample Drawn into one sorbent tube, refrigerated  
Barometric Pressure 754 mmHg  
Atmospheric Temperature 33.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
n-Hexane	09:00 AM - 11:00 AM	ppm	-	0.03	<0.03	500	NIOSH (2003), 1500	MOL	Bangkok

### Guideline :

MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)

Sampled By : Norranon Tathongkham

### Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

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Approved by

*Orawan R.*

Orawan Rakyong  
Scientist (3)

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## Analysis / Test Report

Client : Thai Polyethylene Co., Ltd.

10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150

P/O : PMM-23-11

Project Name : Environmental Monitoring

Project Location :

Lot ID: 2444061

Date Received : May 10, 2024

Date Reported : May 23, 2024

Report Number : 2969721-1

Page 3 of 3

Sample Number 2444061-3  
Sampled Date May 09, 2024  
Sample Description Air Quality  
Location พหลพลพยุหเสนา Catalyst D110 โรงงาน HDPE1  
Date Analysis Commenced May 11, 2024  
Condition of Sample Drawn into one sorbent tube, refrigerated  
Barometric Pressure 754 mmHg  
Atmospheric Temperature 33.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
n-Hexane	09:05 AM - 11:05 AM	ppm	-	0.03	0.04	500	NIOSH (2003), 1500	MOL	Bangkok

### Guideline :

MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)

Sampled By : Norranon Tathongkham

### Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

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Approved by

*Orawan R.*

Orawan Rakyong  
Scientist (3)

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ระดับเสียงภายในสถานประกอบการ



## Analysis / Test Report

**Client :** Thai Polyethylene Co., Ltd.  
10, Map Ta Phut Industrial Estate I-1 Road, Map Ta Phut, Muang District, Rayong  
Thailand 21150  
**P/O :** PMM-23-11  
**Project Name :** Environmental Monitoring  
**Project Location :** HDPE#1

**Lot ID: 2444065**

Date Received : May 10, 2024  
Date Reported : May 14, 2024  
Report Number : 2969744-1

Page 1 of 1

<b>Sample Number</b>	2444065-1
<b>Sampled Date</b>	May 09, 2024
<b>Sample Description</b>	Noise Dose (Leq 12 hrs.)
<b>Location</b>	พนักงานทุกคนที่ปฏิบัติงานในพื้นที่ที่มีเสียงดัง
<b>Personal Sampling</b>	คุณเชษฐฤทธิ์ ดินส่วิจิตร
<b>Date Analysis Commenced</b>	May 13, 2024

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
<b>Air Testing</b>									
Noise Dose (12 hrs.) (Calculated from Avg)	07:30 AM - 07:30 PM	%	-	1	50.1	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
Noise Dose (8 hrs.)	07:30 AM - 07:30 PM	%	-	1	46.8	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (12 hrs.) (Calculated from Avg)	07:30 AM - 07:30 PM	dB(A)	-	-	80.0	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (8 hrs.)	07:30 AM - 07:30 PM	dB(A)	-	-	81.7	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong

### Guideline :

- MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)  
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)  
\* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)

**Sampled By :** Norranon Tathongkham

### Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

Supot Salamteh  
Section Head

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## ภาคผนวก ค-2

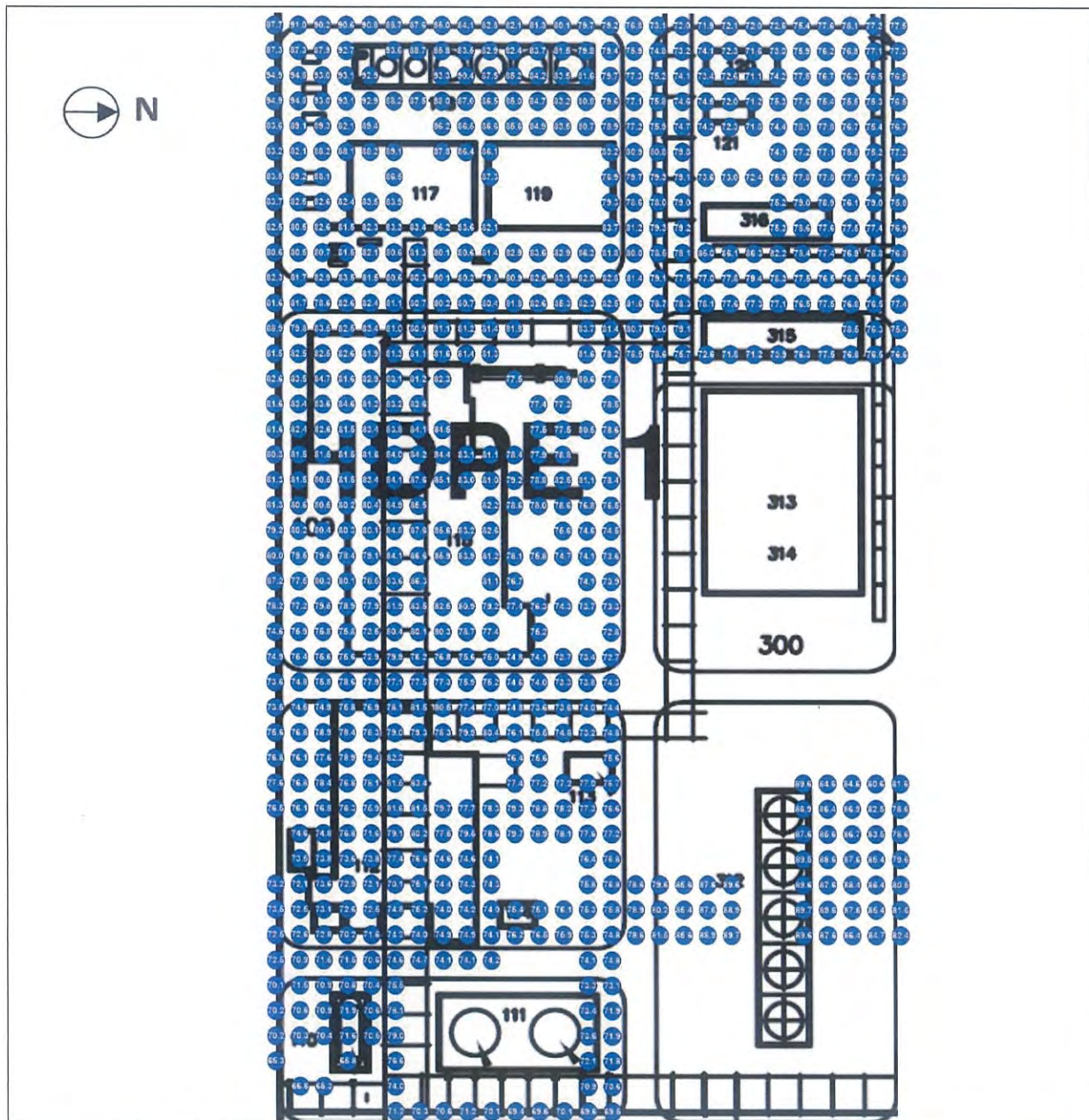
---

แผนผังแสดงเส้นเสียง (Noise Contour Map)





right solutions.  
right partner.

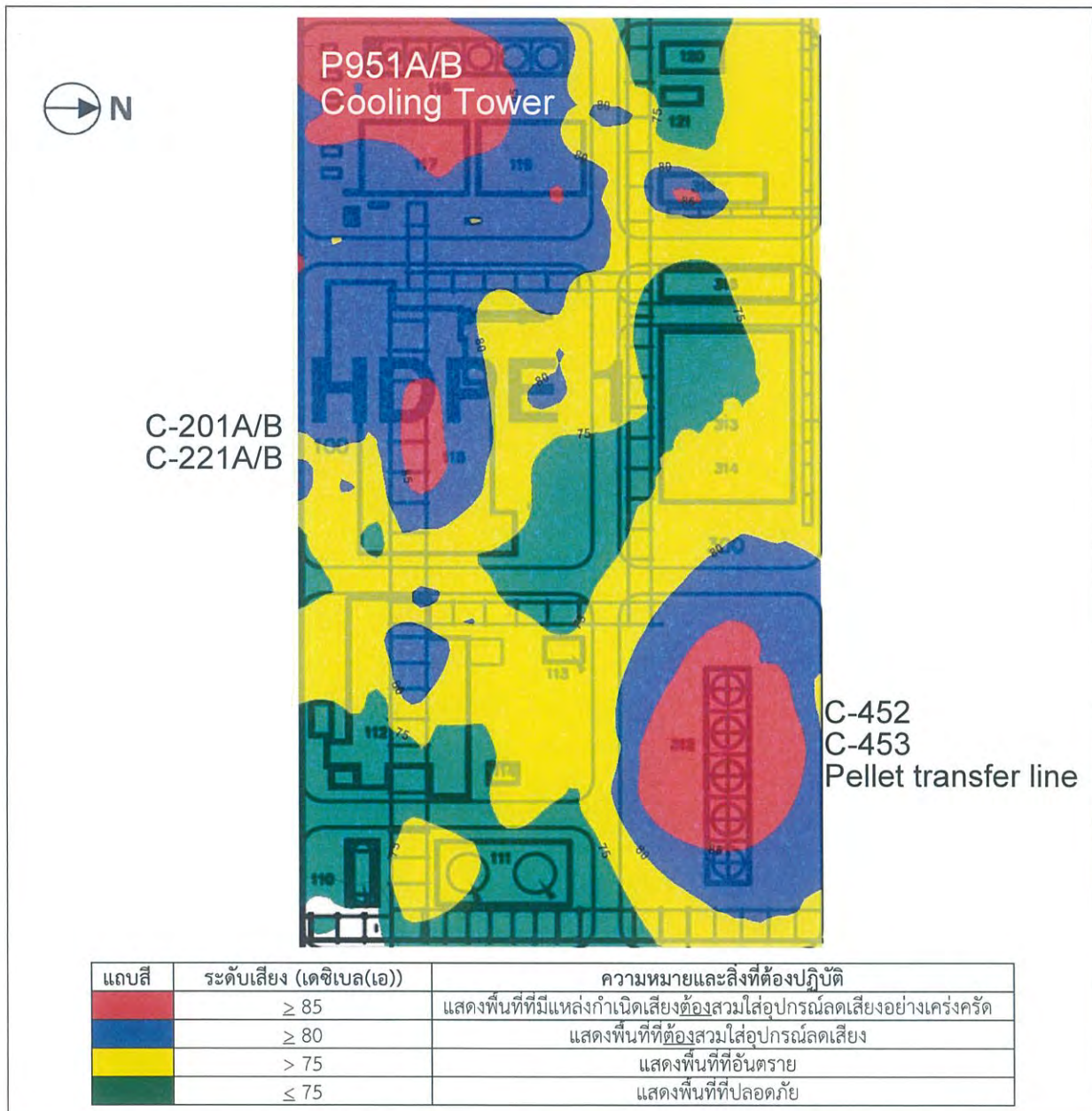


รูปที่ 1 ผลการตรวจวัดระดับเสียงภายในสถานประกอบการ บริเวณพื้นที่กระบวนการผลิต  
โรงงานผลิตเม็ดพลาสติกโพลีเอททีลีน ชนิดความหนาแน่นสูง (HDPE#1)





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right partner.



รูปที่ 2 แผนผังแสดงระดับเสียง (Noise Contour Map) บริเวณพื้นที่กระบวนการผลิต  
โรงงานผลิตเม็ดพลาสติกโพลีเอททีลีน ชนิดความหนาแน่นสูง (HDPE#1)

## ภาคผนวก ค-3

---

การสำรวจสภาพเศรษฐกิจ-สังคม





สรุปผลการสำรวจ ความคิดเห็น  
สภาพเศรษฐกิจ-สังคมที่มีต่อ  
กลุ่มโรงงานพื้นที่ TPE SITE 1  
[PP2, PP1, HDPE1, LLDPE, LDPE]  
ในปี พ.ศ. 2566

โดย บริษัท จีมิเรซ จำกัด



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ภาคผนวก ง

ใบรับรองการสอบเทียบเครื่องมือ





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# รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal.	Freq. Calibrate (Months)
Ambient	Particulate Matter (PM-10)	High Volume	RYG-FS0667			On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG-FS0666			On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG-FS0189			On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG-FS0191			On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG-FS0187			On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG-FS0185			On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG-FS0188			On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG-FS0190			On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG-FS0189			On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG-FS0187			On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG-FS0294			On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG-FS0667			On site Calibration
Ambient	Particulate Matter (PM-10)	Digital Balance	RYG-EN0001	22-Feb-24	22-Feb-25	12
Ambient	n-Hexane	Field Rotameter	RYG-FS1098	8-Apr-24	8-Apr-24	3
Ambient	n-Hexane	Field Rotameter	RYG-FS0189	4-Apr-24	4-Apr-24	3
Ambient	n-Hexane	Field Rotameter	RYG-FS0199	1-Apr-24	1-Jul-24	3
Ambient	n-Hexane	Field Rotameter	RYG-FS0657	1-Apr-24	1-Jul-24	3
Ambient	n-Hexane	GC-FID	BK-FN0126	21-Apr-23	21-Oct-24	18
Workplace	n-Hexane	Field Rotameter	RYG-FS0199	4-Apr-24	4-Apr-24	3
Workplace	n-Hexane	DRYCAL FLOWMETER	BK-FS1347	18-Aug-23	18-Aug-24	12
Workplace	n-Hexane	GC-FID	BK-FN0126	21-Apr-23	21-Oct-24	18
Noise	Noise Dose, TWA	Dose Noise Reader	RYG-FS0440	24-Jan-24	24-Jan-25	12
Noise	185-24 Hz	Sound Calibrator	RYG-FS0496	24-Jan-24	24-Jan-25	12
Noise	185-24 Hz	Sound Level Meter	RYG-FS0024	25-Jan-24	24-Jan-25	12
Rayong Lab	gm at 25 °C	gm Meter	RYG-EN0152	14-Dec-23	14-Dec-24	12
Rayong Lab	BOD	BOD meter with Sensor	RYG-EN0010	24-Jul-23	24-Jan-25	18
Rayong Lab	BOD	RYG-EN0154	24-Jul-23	24-Jan-25	18	18
Rayong Lab	Total Suspended Solids	Electronic Balance	RYG-EN0002	22-Feb-24	22-Feb-25	12
Rayong Lab	Total Suspended Solids	Hot Air Oven	RYG-EN0010	21-Mar-24	21-Sep-25	18
Rayong Lab	Total Dissolved Solids (TDS)	Electronic Balance	RYG-EN0002	22-Feb-24	22-Feb-25	12
Rayong Lab	Total Dissolved Solids (TDS)	Hot Air Oven	RYG-EN0010	21-Mar-24	21-Sep-25	18
Rayong Lab	Oil & Grease	Electronic Balance	RYG-EN0002	22-Feb-24	22-Feb-25	12
Rayong Lab	Oil & Grease	Hot Air Oven	RYG-EN0213	21-Mar-24	21-Sep-25	18
Rayong Lab	Oil & Grease	Water Bath	RYG-EN0061	21-Mar-24	21-Sep-25	18
Rayong Lab	Settleable Solids	Chamber (Cooking Room)	RYG-EN0184	25-Jan-23	25-Jul-24	18
Rayong Lab	Total Volatile Nitrogen	Blood Digestion Unit	RYG-EN0188	11-Mar-24	11-Sep-25	18
Rayong Lab	Total Volatile Nitrogen	gm Meter	RYG-EN0152	14-Dec-23	14-Dec-24	12
Rayong Lab	Sulfide	Chamber (Cooking Room)	RYG-EN0184	25-Jan-23	25-Jul-24	18
Rayong Lab	Temperature	gm meter	RYG-FS0607	8-Dec-23	8-Dec-24	12
Rayong Lab	COD	Spectrophotometer	RYG-EN0037	18-Sep-23	18-Mar-25	18
Water Lab	n-Hexane	Gas Chromatography (MS)	BK-FN0059	13-Dec-23	13-Jun-25	18
Water Lab	Chloride	gm TSE Meter	RYG-EN0152	14-Dec-23	14-Dec-24	12
Water Lab	Total Organic Carbon	TDC Analyzer	BK-FN0066	10-Nov-23	10-Nov-24	12
Water Lab	PM TSP <sub>2.5</sub>	Lab Chromatography (MS)	BK-FN0039	13-Dec-23	13-Jun-25	18

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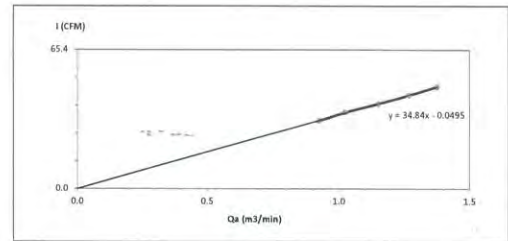
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## High Volume Air Sampler Calibration Worksheet

Project Site : Thai Polyethylene Co., Ltd. Barometric Pressure (mm Hg) : 761  
 Calibrate Location : ชุมชนพื้นที่โรงงาน HDPE1 ตำบลโคกใหญ่ Temperature (°C) : 30  
 Calibrate Date : 22-Jan-24 High Volume ID : RYG-FS0667  
 CalibrationSheet No. : C-220124-RYG-FS0667 High Volume Model : TE-5009X  
 Calibrator ID : RYG-FS0206 High Volume S/N : 6266  
 Calibrator Model : TE-5028A Calibrator Slope : 0.92345  
 Calibrator S/N : 1543 Calibrator Intercept : -0.0095

Test No.	Delta H <sub>2</sub> O (inch)	Q <sub>a</sub> (m <sup>3</sup> /min)	I: Chart (CFM)	Linear Regression
1	1.8	0.926	32	Slope : 34.8395
2	2.2	1.023	36	Intercept : -0.0495
3	2.8	1.153	40	Correlation Coefficient : 0.9991
4	3.4	1.269	44	
5	4.0	1.376	48	



Calibrated by สุภัทรา ทรัพย์  
 (Mr.Chatchai Sukpia)  
 Field Scientist(1)

Approved by น.อ. นพปอง จันทารูปาน  
 (Mr.Noppong Jantarupai)  
 Enviro Field Coordinator Scientist (3)

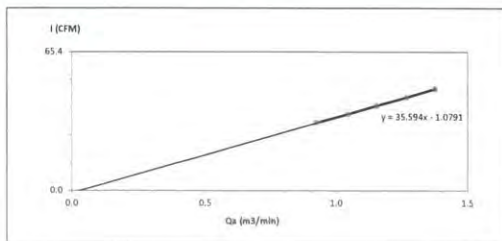
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## High Volume Air Sampler Calibration Worksheet

Project Site : Thai Polyethylene Co., Ltd. Barometric Pressure (mm Hg) : 761  
 Calibrate Location : ชุมชนพื้นที่โรงงาน HDPE1 ตำบลโคกใหญ่ Temperature (°C) : 30  
 Calibrate Date : 22-Jan-24 High Volume ID : RYG-FS0666  
 CalibrationSheet No. : C-220124-RYG-FS0666 High Volume Model : TE-5009X  
 Calibrator ID : RYG-FS0206 High Volume S/N : 6265  
 Calibrator Model : TE-5028A Calibrator Slope : 0.92345  
 Calibrator S/N : 1543 Calibrator Intercept : -0.0095

Test No.	Delta H <sub>2</sub> O (inch)	Q <sub>a</sub> (m <sup>3</sup> /min)	I: Chart (CFM)	Linear Regression
1	1.8	0.926	32	Slope : 35.5941
2	2.3	1.046	36	Intercept : -1.0791
3	2.8	1.153	40	Correlation Coefficient : 0.9999
4	3.4	1.269	44	
5	4.0	1.376	48	



Calibrated by สุภัทรา ทรัพย์  
 (Mr.Chatchai Sukpia)  
 Field Scientist(1)

Approved by น.อ. นพปอง จันทารูปาน  
 (Mr.Noppong Jantarupai)  
 Enviro Field Coordinator Scientist (3)

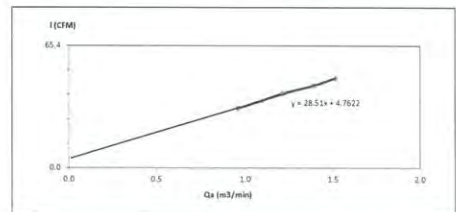
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## High Volume Air Sampler Calibration Worksheet

Project Site : Thai Polyethylene Co., Ltd. Barometric Pressure (mm Hg) : 755  
 Calibrate Location : ชุมชนพื้นที่โรงงาน HDPE1 ตำบลโคกใหญ่ Temperature (°C) : 31  
 Calibrate Date : 27-Feb-24 High Volume ID : RYG-FS0189  
 CalibrationSheet No. : C-270224-RYG-FS0189 High Volume Model : TE-5009X  
 Calibrator ID : RYG-FS0205 High Volume S/N : 4797  
 Calibrator Model : TE-5028A Calibrator Slope : 0.94434  
 Calibrator S/N : 1166 Calibrator Intercept : -0.01792

Test No.	Delta H <sub>2</sub> O (inch)	Q <sub>a</sub> (m <sup>3</sup> /min)	I: Chart (CFM)	Linear Regression
1	2.8	0.963	32	Slope : 28.5097
2	2.6	1.096	36	Intercept : 4.7622
3	3.2	1.215	40	Correlation Coefficient : 0.9982
4	4.2	1.390	44	
5	5.0	1.515	48	



Calibrated by สุภัทรา ทรัพย์  
 (Mr.Jakkarin Manwicksa)  
 Field Scientist(1)

Approved by น.อ. นพปอง จันทารูปาน  
 (Mr.Noppong Jantarupai)  
 Enviro Field Coordinator Scientist (3)

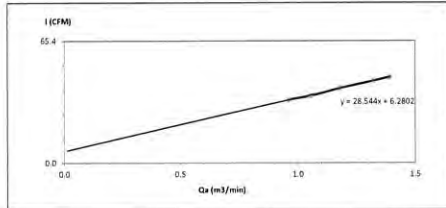
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### High Volume Air Sampler Calibration Worksheet

Project Site: Thai Polyethylene Co., Ltd. Barometric Pressure (mm Hg): 755  
Calibrate Location: โรงงานผลิตชิ้นส่วน HDPE1 ตำบลไผ่ Temperature (°C): 31  
Calibrate Date: 27-Feb-24 High Volume ID: RYG-FS0191  
Calibration Sheet No.: C-270224-RYG-FS0191 High Volume Model: TE-5009X  
Calibrator ID: RYG-FS0205 High Volume S/N: 5338  
Calibrator Model: TE-5028A Calibrator Slope: 0.94434  
Calibrator S/N: 1166 Calibrator Intercept: -0.01292

Test No.	Delta H <sub>2</sub> O (inch)	Qa (m <sup>3</sup> /min)	I: Chart (CFM)	Linear Regression
1	2.0	0.963	34	Slope: 28.5440 Intercept: 6.2802 Correlation Coefficient: 0.9998
2	2.4	1.054	36	
3	3.0	1.177	40	
4	3.8	1.323	44	
5	4.2	1.390	46	



Calibrated by: Satcha P. Approved by: Mr. Noppong Juntarupan  
(Mr. Satcha Phetsawaeng) (Mr. Noppong Juntarupan)  
Field Scientist(3) Enviro Field Coordinator Scientist (3)

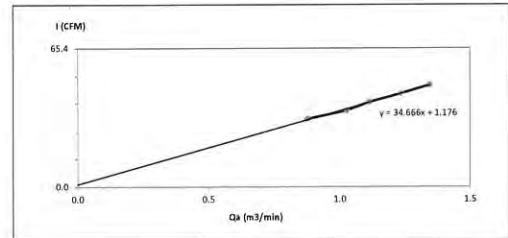
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### High Volume Air Sampler Calibration Worksheet

Project Site: Thai Polyethylene Co., Ltd. Barometric Pressure (mm Hg): 761  
Calibrate Location: โรงงานผลิตชิ้นส่วน HDPE1 ตำบลไผ่ Temperature (°C): 32  
Calibrate Date: 25-Mar-24 High Volume ID: RYG-FS0187  
Calibration Sheet No.: C-250324-RYG-FS0187 High Volume Model: TE-5009X  
Calibrator ID: RYG-FS0206 High Volume S/N: 4795  
Calibrator Model: TE-5028A Calibrator Slope: 0.92345  
Calibrator S/N: 1543 Calibrator Intercept: -0.0095

Test No.	Delta H <sub>2</sub> O (inch)	Qa (m <sup>3</sup> /min)	I: Chart (CFM)	Linear Regression
1	1.6	0.877	32	Slope: 34.6661 Intercept: 1.1769 Correlation Coefficient: 0.9974
2	2.2	1.026	36	
3	2.6	1.115	40	
4	3.2	1.236	44	
5	3.8	1.346	48	



Calibrated by: Satcha P. Approved by: Mr. Noppong Juntarupan  
(Mr. Satcha Phetsawaeng) (Mr. Noppong Juntarupan)  
Field Scientist(3) Enviro Field Coordinator Scientist (3)

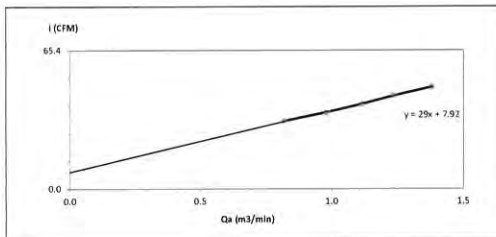
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### High Volume Air Sampler Calibration Worksheet

Project Site: Thai Polyethylene Co., Ltd. Barometric Pressure (mm Hg): 761  
Calibrate Location: โรงงานผลิตชิ้นส่วน HDPE1 ตำบลไผ่ Temperature (°C): 32  
Calibrate Date: 25-Mar-24 High Volume ID: RYG-FS0185  
Calibration Sheet No.: C-250324-RYG-FS0185 High Volume Model: TE-5009X  
Calibrator ID: RYG-FS0206 High Volume S/N: 4793  
Calibrator Model: TE-5028A Calibrator Slope: 0.92345  
Calibrator S/N: 1543 Calibrator Intercept: -0.0095

Test No.	Delta H <sub>2</sub> O (inch)	Qa (m <sup>3</sup> /min)	I: Chart (CFM)	Linear Regression
1	1.4	0.821	32	Slope: 28.9997 Intercept: 7.9200 Correlation Coefficient: 0.9991
2	2.0	0.979	36	
3	2.6	1.115	40	
4	3.2	1.236	44	
5	4.0	1.381	48	



Calibrated by: Satcha P. Approved by: Mr. Noppong Juntarupan  
(Mr. Satcha Phetsawaeng) (Mr. Noppong Juntarupan)  
Field Scientist(3) Enviro Field Coordinator Scientist (3)

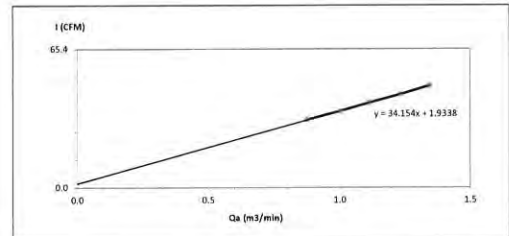
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### High Volume Air Sampler Calibration Worksheet

Project Site: Thai Polyethylene Co., Ltd. Barometric Pressure (mm Hg): 757  
Calibrate Location: โรงงานผลิตชิ้นส่วน HDPE1 ตำบลไผ่ Temperature (°C): 30  
Calibrate Date: 1-Apr-24 High Volume ID: RYG-FS0188  
Calibration Sheet No.: C-010424-RYG-FS0188 High Volume Model: TE-5009X  
Calibrator ID: RYG-FS0206 High Volume S/N: 4796  
Calibrator Model: TE-5028A Calibrator Slope: 0.92345  
Calibrator S/N: 1543 Calibrator Intercept: -0.0095

Test No.	Delta H <sub>2</sub> O (inch)	Qa (m <sup>3</sup> /min)	I: Chart (CFM)	Linear Regression
1	1.6	0.876	32	Slope: 34.1541 Intercept: 1.9338 Correlation Coefficient: 0.9998
2	2.1	1.002	36	
3	2.6	1.114	40	
4	3.2	1.235	44	
5	3.8	1.345	48	



Calibrated by: Anurak Approved by: Mr. Noppong Juntarupan  
(Mr. Anurak Tongkhajonsakda) (Mr. Noppong Juntarupan)  
Field Scientist(1) Enviro Field Coordinator Scientist (3)

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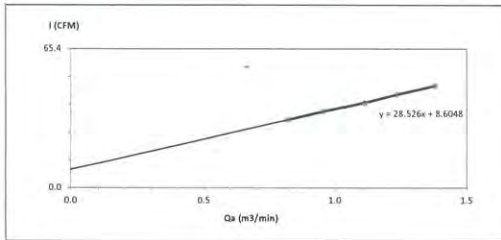




### High Volume Air Sampler Calibration Worksheet

Project Site: Thai Polyethylene Co., Ltd.  
Calibrate Location: โรงงานผลิต HDPE1 ตำบลโคกไผ่  
Calibrate Date: 1-Apr-24  
Calibration Sheet No.: C-010424-RYG\_PS0190  
Calibrator ID: RYG\_PS0206  
Calibrator Model: TE-5028A  
Calibrator S/N: 1543  
Barometric Pressure (mm Hg): 757  
Temperature (°C): 30  
High Volume ID: RYG\_PS0190  
High Volume Model: G1051  
High Volume S/N: 1625  
Calibrator Slope: 0.92345  
Calibrator Intercept: -0.0095

Test No.	Delta H <sub>2</sub> O (Inch)	Q <sub>a</sub> (m <sup>3</sup> /min)	I: Chart (CFM)	Linear Regression
1	1.4	0.820	32	Slope: 28.5256 Intercept: 8.6048 Correlation Coefficient: 0.9993
2	1.9	0.954	36	
3	2.6	1.114	40	
4	3.2	1.235	44	
5	4.0	1.380	48	



Calibrated by:   
(Mr. Anurak Tongkhajonsuksa)  
Field Scientist (1)

Approved by:   
(Mr. Noppong Juntarupan)  
Enviro Field Coordinator Scientist (3)

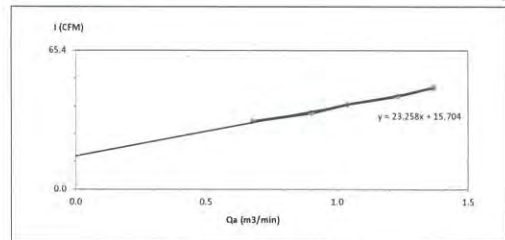
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### High Volume Air Sampler Calibration Worksheet

Project Site: Thai Polyethylene Co., Ltd.  
Calibrate Location: โรงงานผลิต HDPE1 ตำบลโคกไผ่  
Calibrate Date: 8-May-24  
Calibration Sheet No.: C-080524-RYG\_PS0189  
Calibrator ID: RYG\_PS0205  
Calibrator Model: TE-5028A  
Calibrator S/N: 1166  
Barometric Pressure (mm Hg): 775.6  
Temperature (°C): 32.2  
High Volume ID: RYG\_PS0189  
High Volume Model: TE-5009X  
High Volume S/N: 4797  
Calibrator Slope: 0.95561  
Calibrator Intercept: -0.02266

Test No.	Delta H <sub>2</sub> O (Inch)	Q <sub>a</sub> (m <sup>3</sup> /min)	I: Chart (CFM)	Linear Regression
1	1.0	0.679	32	Slope: 23.2584 Intercept: 15.7039 Correlation Coefficient: 0.9964
2	1.8	0.903	36	
3	2.4	1.040	40	
4	3.4	1.233	44	
5	4.2	1.368	48	



Calibrated by:   
(Mr. Watcharin Pongsamsuan)  
Field Scientist (1)

Approved by:   
(Mr. Noppong Juntarupan)  
Enviro Field Coordinator Scientist (3)

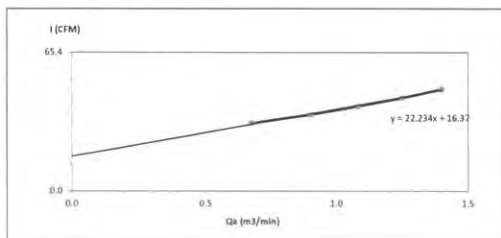
FORM NO. F 06-074 REVISION NO.2 ISSUE DATE: 28/11/23



### High Volume Air Sampler Calibration Worksheet

Project Site: Thai Polyethylene Co., Ltd.  
Calibrate Location: โรงงานผลิต HDPE1 ตำบลโคกไผ่  
Calibrate Date: 8-May-24  
Calibration Sheet No.: C-080524-RYG\_PS0187  
Calibrator ID: RYG\_PS0205  
Calibrator Model: TE-5028A  
Calibrator S/N: 1166  
Barometric Pressure (mm Hg): 775.6  
Temperature (°C): 32.2  
High Volume ID: RYG\_PS0187  
High Volume Model: TE-5009X  
High Volume S/N: 4795  
Calibrator Slope: 0.95561  
Calibrator Intercept: -0.02266

Test No.	Delta H <sub>2</sub> O (Inch)	Q <sub>a</sub> (m <sup>3</sup> /min)	I: Chart (CFM)	Linear Regression
1	1.0	0.679	32	Slope: 22.2336 Intercept: 16.3704 Correlation Coefficient: 0.9970
2	1.8	0.903	36	
3	2.6	1.081	40	
4	3.5	1.251	44	
5	4.4	1.400	48	



Calibrated by:   
(Mr. Watcharin Pongsamsuan)  
Field Scientist (1)

Approved by:   
(Mr. Noppong Juntarupan)  
Enviro Field Coordinator Scientist (3)

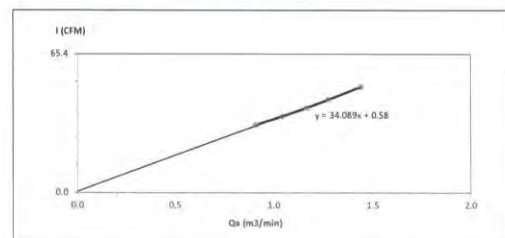
FORM NO. F 06-074 REVISION NO.2 ISSUE DATE: 28/11/23



### High Volume Air Sampler Calibration Worksheet

Project Site: Thai Polyethylene Co., Ltd.  
Calibrate Location: โรงงานผลิต HDPE1 ตำบลโคกไผ่  
Calibrate Date: 11-Jun-24  
Calibration Sheet No.: C-110624-RYG\_PS0294  
Calibrator ID: RYG\_PS0205  
Calibrator Model: TE-5028A  
Calibrator S/N: 1166  
Barometric Pressure (mm Hg): 757  
Temperature (°C): 29  
High Volume ID: RYG\_PS0294  
High Volume Model: TE-5009X  
High Volume S/N: 5501  
Calibrator Slope: 0.95561  
Calibrator Intercept: -0.02266

Test No.	Delta H <sub>2</sub> O (Inch)	Q <sub>a</sub> (m <sup>3</sup> /min)	I: Chart (CFM)	Linear Regression
1	1.8	0.909	32	Slope: 34.0894 Intercept: 0.5800 Correlation Coefficient: 0.9907
2	2.4	1.047	36	
3	3.0	1.167	40	
4	3.6	1.277	44	
5	4.6	1.440	50	



Calibrated by:   
(Mr. Mongkon Phalathip)  
Field Scientist (1)

Approved by:   
(Mr. Noppong Juntarupan)  
Enviro Field Coordinator Scientist (3)

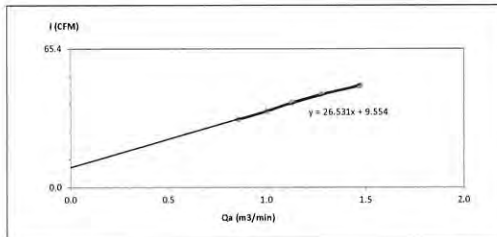
FORM NO. F 06-074 REVISION NO.2 ISSUE DATE: 28/11/23



### High Volume Air Sampler Calibration Worksheet

Project Site: Thai Polyethylene Co., Ltd. Barometric Pressure (mm Hg): 757  
Calibrate Location: โรงงานผลิตพลาสติก HDPE1 ตำบลโคก  
Calibrate Date: 11-Jun-24 Temperature (°C): 29  
Calibration Sheet No.: C-110624-RYG-FS0667 High Volume ID: RYG-FS0667  
Calibrator ID: RYG-FS0205 High Volume Model: TE-5009X  
Calibrator Model: TE-5028A High Volume S/N: 6266  
Calibrator S/N: 1166 Calibrator Slope: 0.95561  
Calibrator Intercept: -0.02266

Test No.	Delta H <sub>2</sub> O (inch)	Qa (m <sup>3</sup> /min)	I: Chart (CFM)	Linear Regression
1	1.6	0.859	32	Slope: 26.5307
2	2.2	1.003	36	Intercept: 9.5540
3	2.8	1.129	40	Correlation Coefficient: 0.9967
4	3.6	1.277	44	
5	4.8	1.471	48	



Calibrated by: Mongkon Ph.  
(Mr. Mongkon Phulathip)  
Field Scientist (1)

Approved by: [Signature]  
(Mr. Noppong Jantarapan)  
Enviro Field Coordinator Scientist (3)

FORM NO. F 06-074 REVISION NO.2 ISSUE DATE: 20/11/23

Sartorius (Thailand) Co., Ltd.  
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310  
Tel: +66 2643 8361-6, e-mail: service.thailand@sartorius.com



SARTORIUS

## Certificate of Calibration

REVIEW BY: [Signature]  
APPROVED BY: [Signature]  
NEXT CAL. DATE: 01/09/24

Model Number: LA130S-F Certificate No.: 23BCI0110  
Description: Analytical Balance Issued Date: Friday, March 03, 2023  
Serial Number: 25409664 Reference No.: 204833  
ID No.: RYG\_EN0001  
Manufacturer: Sartorius Page No.: 1 of 2

Customer Name: ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)  
616/10 Moo 5 T. Maenam Khu. A. Pluak Daeng, Rayong 21140, Thailand

Calibrated Place: ALS Laboratory Group (Thailand) Co., Ltd. (Balance Room)  
616/10 Moo 5 T. Maenam Khu. A. Pluak Daeng, Rayong 21140, Thailand

Calibrated By: Mr. Chonchai Inthana  
Calibration Date: Wednesday, March 01, 2023  
Calibration Procedure No.: This calibration was conducted by Using in-house calibration procedure number (WI-003)  
Based on UKAS LAB 14: 2019

Metrological data:  
Capacity: 150 g Readability: 0.0001 g  
Reasons for calibration:  
☐ New Installation ☐ Service / Repair ☒ Re-calibration/ Maintenance  
Equipment Condition: ☒ Good Operate ☐ Fair

Measurement Method: UKAS Publication Ref: Lab 14  
The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM). The calibration certificate documents the traceability to National Standards, which realise the unit of measurement according to the International Standard System of Units (SI). Report of Tolerance came from list of Sartorius Metrological Specifications.

### Traceability:

Model Number	Description	Traceability	Certificate No.	Due Date
YCS011-522-00	Sartorius weight set 1mg - 5000g E2 YCS011-522-00	SPC-RT	C02212565	14-Sep-2023
MHB-382SD	Humidity/Barometer/Temp. Lutron MHB-382SD	DKSH	C19220444	5-Sep-2023

This certificate relate and apply this equipment only.  
This certificate may not be reproduced other than in full except with the prior written approval of the Verification Operation Division  
Sartorius (Thailand) Co., Ltd.

[Signature]  
Mr. Chonchai Inthana (Technical Manager)

SOP FM 33 03 February 2022



Sartorius (Thailand) Co., Ltd.  
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310  
Tel: +66 2643 8361-6 Fax: +66 2643 8367, e-mail: service.thailand@sartorius.com

SARTORIUS

## Certificate of Calibration

Model Number: LA130S-F Certificate No.: 23BCI0110  
Description: Analytical Balance Issued Date: Friday, March 03, 2023  
Serial Number: 25409664 Reference No.: 204833  
ID No.: RYG\_EN0001  
Manufacturer: Sartorius Page No.: 2 of 2

### Calibration Results : Without Adjustment

Repeatability	Eccentricity (Off-center loading error)
The reproducibility is the ability of a weighing instrument to display nearly identical results under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.	The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of maximum capacity, placed in the middle of the weighing pan and between each of four additional measurement points (4 positions defined according to GUM, R78).
Nominal Value (Low Load) 10 g Tolerance 0.0001 g	Nominal value 50 g Tolerance 0.0004 g
Nominal Value (High Load) 100 g Tolerance 0.0001 g	
Standard Deviation	

### Linearity

The linearity, also called linearity error, describes the deviation of the characteristic curve of a weighing instrument from the linear slope.

Tolerance 0.0002 g				
Nominal Value	Conventional Mass Value	Displayed Value	Deviation	Uncertainty
(g)	(g)	(g)	(g)	(g)
0.01	0.0100	0.0100	0.0000	0.00022
0.05	0.0500	0.0500	0.0000	0.00023
0.1	0.1000	0.1000	0.0000	0.00023
0.5	0.5000	0.5000	0.0000	0.00023
1	1.0000	1.0000	0.0000	0.00023
2	2.0000	2.0000	0.0000	0.00023
5	5.0000	5.0000	0.0000	0.00022
10	10.0000	10.0001	0.0001	0.00024
20	20.0000	20.0001	0.0001	0.00023
100	100.0000	100.0002	0.0002	0.00026

End of Report

SOP FM 33 03 February 2022

Sartorius (Thailand) Co., Ltd.  
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310  
Tel: +66 2643 8361-6, e-mail: service.thailand@sartorius.com



SARTORIUS

## Certificate of Calibration

Model Number: LA130S-F Certificate No.: 24BCI0068  
Description: Analytical Balance Issued Date: Friday, February 23, 2024  
Serial Number: 25409664 Reference No.: 229196  
ID No.: RYG\_EN0001  
Manufacturer: Sartorius Page No.: 1 of 2

Customer Name: ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)  
616/10 Moo 5 T. Maenam Khu. A. Pluak Daeng, Rayong 21140, Thailand

Calibrated Place: ALS Laboratory Group (Thailand) Co., Ltd. (Balance Room)  
616/10 Moo 5 T. Maenam Khu. A. Pluak Daeng, Rayong 21140, Thailand

Calibrated By: Mr. Chonchai Inthana  
Calibration Date: Thursday, February 22, 2024  
Calibration Procedure No.: This calibration was conducted by Using in-house calibration procedure number (WI-003)  
Based on UKAS LAB 14: 2019

Metrological data:  
Capacity: 150 g Readability: 0.0001 g  
Reasons for calibration:  
☐ New Installation ☐ Service / Repair ☒ Re-calibration/ Maintenance  
Equipment Condition: ☒ Good Operate ☐ Fair

Measurement Method: UKAS Publication Ref: Lab 14  
The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM). The calibration certificate documents the traceability to National Standards, which realise the unit of measurement according to the International Standard System of Units (SI). Report of Tolerance came from list of Sartorius Metrological Specifications.

### Traceability:

Model Number	Description	Traceability	Certificate No.	Due Date
YCS011-522-00	Sartorius weight set 1mg - 5000g E2 YCS011-522-00	TCS	M2308197S	23-Aug-2025
MHB-382SD	Humidity/Barometer/Temp. Lutron MHB-382SD	DKSH	C19231845	23-Aug-2024

This certificate relate and apply this equipment only.  
This certificate may not be reproduced other than in full except with the prior written approval of the Verification Operation Division  
Sartorius (Thailand) Co., Ltd.

[Signature]  
Mr. Chonchai Inthana (Technical Manager)

SOP FM 33 03 February 2022





# Certificate of Calibration

Model Number : LA130S-F  
Description : Analytical Balance  
Serial Number : 25409664  
ID No. : RYG\_EN0001  
Manufacturer : Sartorius

Certificate No. : 24BCI0068  
Issued Date : Friday, February 23, 2024  
Reference No. : 229195  
Page No. : 2 of 2

## Calibration Results : Without Adjustment

### Repeatability

The repeatability is the ability of a weighing instrument to display nearly identical readings under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.

Nominal Value : (Low Load)	10.0000	99.9999
10 g	10.0000	100.0000
Tolerance	10.0000	100.0001
0.0001 g	10.0000	100.0001
	9.9999	100.0000
Nominal Value : (High Load)	10.0000	100.0001
100 g	10.0000	100.0000
Tolerance	10.0000	100.0001
0.0001 g	9.9999	100.0002
	9.9999	100.0001
Standard Deviation	0.00005	0.00008

### Eccentricity (Off-center loading error)

The off-center loading error is yielded by the difference between the reading of the load (i.e. 10 or 14 of maximum capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R76).

Nominal value :	50 g
Tolerance	0.0004 g
	Difference
1	-
2	-0.0001
3	0.0001
4	0.0002
5	0.0000
6	-

### Linearity

The linearity, also called linearity error, describes the deviation of the characteristic curve of a weighing instrument from the linear slope.

Tolerance		0.0002 g		
Nominal Value	Conventional Mass Value	Displayed Value	Deviation	Uncertainty
(g)	(g)	(g)	(g)	(g)
0.01	0.0100	0.0100	0.0000	0.00020
0.05	0.0500	0.0500	0.0000	0.00021
0.1	0.1000	0.1000	0.0000	0.00021
0.5	0.5000	0.5000	0.0000	0.00021
1	1.0000	1.0000	0.0000	0.00021
2	2.0000	2.0000	0.0000	0.00021
5	5.0000	5.0000	0.0000	0.00021
10	10.0000	10.0001	0.0001	0.00024
20	20.0000	20.0001	0.0001	0.00021
100	100.0000	99.9999	-0.0001	0.00024

End of Report.

SOP FM 33 03 February 2022



## ROTA METER CALIBRATION RESULT JANUARY 2024

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R <sup>2</sup> )
BKK_FS0585	10 Jan 24	Y = 1.0351x + 2.3733	0.9998
BKK_FS0587	10 Jan 24	Y = 1.0168x + 15.05	0.9997
BKK_FS0592	10 Jan 24	Y = 1.0013x + 12.556	1.0000
BKK_FS0594	10 Jan 24	Y = 1.0048x + 4.9762	1.0000
BKK_FS1004	04 Jan 24	Y = 0.9873x + 13.47	0.9993
BKK_FS1005	04 Jan 24	Y = 1.0187x + 1.25	0.9998
BKK_FS1006	04 Jan 24	Y = 1.1589x - 3.6605	0.9981
BKK_FS1007	10 Jan 24	Y = 1.1347x + 1.6007	0.9989
BKK_FS1008	10 Jan 24	Y = 1.127x + 4.3827	0.9996
BKK_FS1017	04 Jan 24	Y = 1.0632x - 0.0701	0.9998
BKK_FS1018	04 Jan 24	Y = 1.0115x + 1.2867	0.9996
BKK_FS1019	04 Jan 24	Y = 1.0019x + 8.4867	1.0000
BKK_FS1026	19 Jan 24	Y = 0.9618x + 1.9626	0.9999
BKK_FS1027	19 Jan 24	Y = 1.0065x - 4.3786	1.0000
BKK_FS1028	19 Jan 24	Y = 1.0184x - 37.308	0.9997
BKK_FS1029	19 Jan 24	Y = 0.9809x + 2.7925	0.9977
BKK_FS1030	19 Jan 24	Y = 0.996x - 1.3286	1.0000
BKK_FS1031	19 Jan 24	Y = 1.015x - 27.236	0.9997
BKK_FS1039	04 Jan 24	Y = 1.0047x + 8.0267	0.9997
BKK_FS1040	04 Jan 24	Y = 1.0059x + 3.6952	1.0000
BKK_FS1041	04 Jan 24	Y = 1.0677x - 0.0486	0.9995
BKK_FS1042	04 Jan 24	Y = 1.0021x + 11.273	0.9995
BKK_FS1043	04 Jan 24	Y = 1.0023x + 8.3905	1.0000
BKK_FS1044	04 Jan 24	Y = 1.0738x + 1.2527	0.9997
PHK_FS0027	10 Jan 24	Y = 1.1096x + 0.3565	1.0000
PHK_FS0028	10 Jan 24	Y = 1.034x - 2.52	1.0000
PHK_FS0029	10 Jan 24	Y = 1.0017x + 8.0124	1.0000
RYG_FS0197	04 Jan 24	Y = 1.0045x + 10.275	1.0000
RYG_FS0198	04 Jan 24	Y = 1.0024x + 10.1	1.0000
RYG_FS0199	04 Jan 24	Y = 1.0343x - 0.3854	0.9999
RYG_FS0654	04 Jan 24	Y = 1.0529x + 0.1565	0.9996
RYG_FS0655	04 Jan 24	Y = 0.992x + 8.9667	0.9992
RYG_FS0656	04 Jan 24	Y = 1.0068x - 2.8429	1.0000
RYG_FS0657	04 Jan 24	Y = 1.0472x + 1.9228	0.9999
RYG_FS0658	04 Jan 24	Y = 0.9675x + 20.263	0.9996
RYG_FS0659	04 Jan 24	Y = 1.0028x + 10.275	1.0000
SGK_FS0135	17 Jan 24	Y = 1.0145x + 8.273	1.0000
SGK_FS0136	17 Jan 24	Y = 1.0113x + 1.75	0.9999
SGK_FS0138	04 Jan 24	Y = 1.0632x - 1.0034	0.9999

Page 1 of 2

ALS Laboratory Group



## ROTA METER CALIBRATION RESULT JANUARY 2024

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R <sup>2</sup> )
SGK_FS0139	04 Jan 24	Y = 1.0047x + 1.8667	0.9999
SGK_FS0140	04 Jan 24	Y = 1.0001x + 14.149	1.0000
SGK_FS0141	04 Jan 24	Y = 1.111x - 1.1337	0.9994
SGK_FS0142	04 Jan 24	Y = 1.0179x + 0.3633	0.9999
SGK_FS0143	04 Jan 24	Y = 1.054x + 2.2352	1.0000

Review By :   
(Mr. Wichan Choonharat)  
Enviro Field Services Manager

Approved By :   
(Mr. Sarayuth Jittrantoni)  
Assistant General Manager



## ROTA METER CALIBRATION RESULT APRIL 2024

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R <sup>2</sup> )
BKK_FS0585	23 Apr 24	Y = 1.0322x + 2.25	0.9997
BKK_FS0587	23 Apr 24	Y = 1.0111x + 16.357	0.9994
BKK_FS0592	23 Apr 24	Y = 1.001x + 14.551	1.0000
BKK_FS0594	23 Apr 24	Y = 1.0048x + 4.9762	1.0000
BKK_FS1004	01 Apr 24	Y = 0.9826x + 12.32	0.9998
BKK_FS1005	01 Apr 24	Y = 1.0183x + 0.0633	0.9998
BKK_FS1006	01 Apr 24	Y = 1.1534x - 3.3241	0.9989
BKK_FS1007	23 Apr 24	Y = 1.1084x + 2.9017	0.9994
BKK_FS1008	06 May 24	Y = 1.1347x + 2.1915	0.9996
BKK_FS1012	07 May 24	Y = 1.0488x - 26.533	0.9998
BKK_FS1013	07 May 24	Y = 1.0255x - 57.741	1.0000
BKK_FS1017	04 Apr 24	Y = 1.0213x + 0.1156	1.0000
BKK_FS1018	04 Apr 24	Y = 1.0007x + 1.3933	0.9999
BKK_FS1019	04 Apr 24	Y = 1.0038x - 1.3381	1.0000
BKK_FS1020	04 Apr 24	Y = 1.003x + 5.7656	1.0000
BKK_FS1021	04 Apr 24	Y = 1.0096x - 25.605	0.9926
BKK_FS1022	04 Apr 24	Y = 1.0937x - 103.66	0.9980
BKK_FS1023	07 May 24	Y = 1.1613x - 2.675	1.0000
BKK_FS1024	07 May 24	Y = 1.0157x - 4.3362	1.0000
BKK_FS1025	07 May 24	Y = 1.0018x - 4.6236	0.9999
BKK_FS1039	01 Apr 24	Y = 0.9909x + 11.357	0.9991
BKK_FS1040	01 Apr 24	Y = 1.0121x - 19.203	0.9996
BKK_FS1041	01 Apr 24	Y = 1.0176x + 1.4813	0.9996
BKK_FS1042	01 Apr 24	Y = 0.9927x + 10.76	0.9995
BKK_FS1043	01 Apr 24	Y = 0.9965x + 13.696	1.0000
BKK_FS1044	01 Apr 24	Y = 1.1159x - 0.9354	0.9978
PHK_FS0027	06 May 24	Y = 1.1281x + 0.4949	0.9997
PHK_FS0028	06 May 24	Y = 1.0332x - 1.8233	0.9999
PHK_FS0029	06 May 24	Y = 1.001x + 10.848	1.0000
RYG_FS0197	01 Apr 24	Y = 1.0045x + 10.275	1.0000
RYG_FS0198	01 Apr 24	Y = 1.0061x + 0.715	0.9999
RYG_FS0199	01 Apr 24	Y = 0.976x + 3.1497	0.9998
RYG_FS0654	01 Apr 24	Y = 1.0354x + 0.3361	0.9998
RYG_FS0655	01 Apr 24	Y = 0.978x + 13.603	0.9991
RYG_FS0656	01 Apr 24	Y = 1.0035x + 6.879	0.9999
RYG_FS0657	01 Apr 24	Y = 1.0233x + 0.8908	0.9982
RYG_FS0658	01 Apr 24	Y = 0.9905x + 9.8867	0.9996
RYG_FS0659	01 Apr 24	Y = 0.9994x + 13.924	1.0000
SGK_FS0135	23 Apr 24	Y = 1.0117x + 4.8833	1.0000



## ROTA METER CALIBRATION RESULT APRIL 2024

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R <sup>2</sup> )
SGK_FS0136	23 Apr 24	$Y = 1.0134x + 3.6467$	1.0000
SGK_FS0138	04 Apr 24	$Y = 1.0449x - 0.3684$	0.9988
SGK_FS0139	04 Apr 24	$Y = 1.0086x + 3.1267$	0.9988
SGK_FS0140	04 Apr 24	$Y = 1.0029x + 7.5181$	1.0000
SGK_FS0141	23 Apr 24	$Y = 1.1129x - 0.0619$	0.9997
SGK_FS0142	23 Apr 24	$Y = 1.0136x + 2.4267$	0.9999
SGK_FS0143	23 Apr 24	$Y = 1.0036x + 8.3162$	1.0000

Review By :

*Wichan Choonharat*  
(Mr. Wichan Choonharat)  
Enviro Field Services Manager

Approved By :

*Mr Sarayuth Jittranont*  
(Mr Sarayuth Jittranont)  
Assistant General Manager

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Agilent CrossLab Compliance Services

## Certificate of System Qualification

GC-00

System ID: CN11461066  
Organization Name: ALS Laboratory Group (Thailand) Co., Ltd.  
Organization Location: 104 Soi 40 Phatthanakan Rd, Khwang Suan Luang, Khet Suan Luang, Bangkok 10250

Date: April 21, 2023 3:26:38 PM  
EQP Name: AgilentRecommended  
EQP Revision: GC.02.52  
Overall Qualification Status: Pass

CDS Legon Verification - GC

Logon: Saanguthai Tarak

Overall CDS Legon Verification - GC Test Status

Pass

System Inspection and Basic Safety and Operation

Name: 7890

Setpoint Status: Pass

Overall System Inspection and Basic Safety and Operation Test Status

Pass

Inlet Pressure Decay

Name: 7890

Front SSL

Setpoint Status: Pass

Pressure: 25.0 psi

Pressure Change: -0.1 psi /5 minutes

Agilent Recommended:  $\geq -2.0$  and  $\leq 0.5$ 

Date: April 21, 2023 3:26:38 PM

System ID: CN11461066

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Page 2 of 2

ALS Laboratory Group

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Agilent CrossLab Compliance Services

Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name: 7890  
Front SSL

Setpoint Status: Pass

Inlet Pressure: 25.0 psi Actual 25.2 psi

Accuracy: 0.2 psi

Agilent Recommended:  $\leq 1.2$ 

Overall Inlet Pressure Accuracy Test Status

Pass

Inlet Pressure Decay

Name: 7890  
Back SSL

Setpoint Status: Pass

Pressure: 25.0 psi

Pressure Change: 0.0 psi /5 minutes

Agilent Recommended:  $\geq -2.0$  and  $\leq 0.5$ 

Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name: 7890  
Back SSL

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Agilent CrossLab Compliance Services

Setpoint Status: Pass

Inlet Pressure: 25.0 psi Actual 24.8 psi

Accuracy: 0.2 psi

Agilent Recommended:  $\leq 1.2$ 

Overall Inlet Pressure Accuracy Test Status

Pass

Detector Flow Accuracy

Name: 7890

Front FID

Setpoint Status: Pass

Flow Type: Fuel

Setpoint: 30.0 mL/min Measured Flow: 28.9 mL/min

Accuracy: 1.1 mL/min

Agilent Recommended:  $\leq 10.0$  % setpoint ( 3.0 mL/min )

Limit is percentage of setpoint or 0.5 mL/minute, whichever is largest.

Setpoint Status: Pass

Flow Type: Oxidizer

Setpoint: 400.0 mL/min Measured Flow: 400 mL/min

Accuracy: 0.0 mL/min

Agilent Recommended:  $\leq 10.0$  % setpoint ( 40.0 mL/min )

Limit is percentage of setpoint or 0.5 mL/minute, whichever is largest.

Setpoint Status: Pass

Flow Type: Makeup

Setpoint: 25.0 mL/min Measured Flow: 24.9 mL/min

Accuracy: 0.1 mL/min

Agilent Recommended:  $\leq 10.0$  % setpoint ( 2.5 mL/min )

Limit is percentage of setpoint or 0.5 mL/minute, whichever is largest.

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## Overall Detector Flow Accuracy Test Status

Pass

## Detector Flow Accuracy

Name: 7890  
Back FID

Setpoint Status: Pass  
Flow Type: Fuel  
Setpoint: 30.0 mL/min Measured Flow: 30.7 mL/min

Accuracy: 0.7 mL/min  
Agilent Recommended:  $\leq 10.0$  % setpoint ( 3.0 mL/min )  
Limit is percentage of setpoint or 0.5 mL/min, whichever is largest.

Setpoint Status: Pass  
Flow Type: Oxidizer  
Setpoint: 400.0 mL/min Measured Flow: 399 mL/min

Accuracy: 1.0 mL/min  
Agilent Recommended:  $\leq 10.0$  % setpoint ( 40.0 mL/min )  
Limit is percentage of setpoint or 0.5 mL/min, whichever is largest.

Setpoint Status: Pass  
Flow Type: Makeup  
Setpoint: 25.0 mL/min Measured Flow: 24.6 mL/min

Accuracy: 0.4 mL/min  
Agilent Recommended:  $\leq 10.0$  % setpoint ( 2.5 mL/min )  
Limit is percentage of setpoint or 0.5 mL/min, whichever is largest.

## Overall Detector Flow Accuracy Test Status

Pass

## GC Oven Temperature Accuracy

Name: 7890

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Setpoint Status: Pass  
Zone: Oven

Temperature: 230.0 230.6 °C  
Accuracy: 0.6 °C  
Agilent Recommended:  $\geq -1.0$  % setpoint in K ( -5.0 °C )  
 $\leq 1.0$  % setpoint in K ( 5.0 °C )

Setpoint Status: Pass  
Zone: Oven

Temperature: 100.0 100.9 °C  
Accuracy: 0.9 °C  
Agilent Recommended:  $\geq -1.0$  % setpoint in K ( -3.7 °C )  
 $\leq 1.0$  % setpoint in K ( 3.7 °C )

## Overall GC Oven Temperature Accuracy Test Status

Pass

## GC Oven Temperature Stability

Name: 7890  
Setpoint Status: Pass

Setpoint/Average: 100.0 100.8833 °C  
Temperature: 100.0 100.8833 °C  
Stability: 0.1 °C  
Agilent Recommended:  $\leq 0.5$  °C

## Overall GC Oven Temperature Stability Test Status

Pass

## Scouting Run

Tested Combination1 Front SSL / Front FID  
Injection Tower  
Name: 7893A

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Setpoint Status: Completed

Injection Volume on Column: 1.0 µL

## Overall Scouting Run Status

Completed

## Noise and Drift

Tested Combination1 Front SSL / Front FID  
Name: 7890

Setpoint Status: Pass  
Base Signal: 22.7 pA

ASTM Noise pA 0.06  
Agilent Recommended:  $\leq 0.10$   
Status: Pass  
Drift pA/Hr 0.05  
Agilent Recommended:  $\leq 2.50$   
Status: Pass

## Overall Noise and Drift Test Status

Pass

## Injection Precision

Tested Combination1 Front SSL / Front FID  
Name: 7893A

Setpoint Status: Pass  
Injection Volume on Column: 1.0 µL

Area RSD: 0.32 %  
Agilent Recommended:  $\leq 3.00$   
Retention Time RSD: 0.67 %  
Agilent Recommended:  $\leq 1.00$

## Overall Injection Precision Test Status

Pass

## Signal to Noise

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Tested Combination1 Front SSL / Front FID  
Injection Tower

Name: 7890

Setpoint Status: Pass  
Signal to Noise: 721755  
Agilent Recommended:  $\geq 300000$

## Overall Signal to Noise Test Status

Pass

## Scouting Run

Tested Combination2 Back SSL / Back FID  
Injection Tower

Name: 7893A

Setpoint Status: Completed  
Injection Volume on Column: 1.0 µL

## Overall Scouting Run Status

Completed

## Noise and Drift

Tested Combination2 Back SSL / Back FID  
Name: 7890

Setpoint Status: Pass  
Base Signal: 22.6 pA

ASTM Noise pA 0.07  
Agilent Recommended:  $\leq 0.10$   
Status: Pass  
Drift pA/Hr 0.09  
Agilent Recommended:  $\leq 2.50$   
Status: Pass

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## Overall Noise and Drift Test Status

Pass

## Injection Precision

Tested Combination2

Back SSL / Back FID

Name: 7693A

Setpoint Status:

Pass

Injection Volume on Column:

1.0

µL

Area RSD:

1.28

%

Retention Time RSD:

0.83

%

Agilent Recommended:

&lt;=

3.00

&lt;=

1.00

## Overall Injection Precision Test Status

Pass

## Signal to Noise

Tested Combination2

Back SSL / Back FID

Name:

Injection Tower

7690

Setpoint Status:

Pass

Signal to Noise:

2404396

Agilent Recommended:

&gt;=

300000

## Overall Signal to Noise Test Status

Pass

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## Instrument Details

## Purpose

This section describes the as found system configuration.

## Details

## System

System ID	CN11461066
Manufacturer	Agilent Technologies
Name	7690
Flow Data Input	Manual Data
Temperature Data Input	Manual Data or Other Data Logging

## Tested Combination1

Injection Technique	Injection Tower
Sampler Identifier	Sampler 2
Inlet	Front
Detector	Front
LTM Included?	No

## Tested Combination2

Injection Technique	Injection Tower
Sampler Identifier	Sampler 3
Inlet	Back
Detector	Back
LTM Included?	No

## Sampler 1

Manufacturer	Agilent Technologies
Type	Tray
Name	7693A
Model Number	G4514A
Serial Number	CN15380030
Firmware Revision	A.11.01
Vial Heater	Not installed

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## Sampler 2

Manufacturer	Agilent Technologies
Type	Injection Tower
Name	7693A
Model Number	G4513A
Serial Number	CN16280128
Firmware Revision	A.10.09
Usage	Sample Injection
Location	Front
Syringe Volume (µL)	10

## Sampler 3

Manufacturer	Agilent Technologies
Type	Injection Tower
Name	7693A
Model Number	G4513A
Serial Number	CN10340103
Firmware Revision	A.10.09
Usage	Sample Injection
Location	Back
Syringe Volume (µL)	10

## Mainframe 1

Manufacturer	Agilent Technologies
Name	7690
Model Number	G3440A
Serial Number	CN11461066
Firmware Revision	Version 4.27
Oven Type	Standard

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## Inlet 1

Manufacturer	Agilent Technologies
Name	7690
Type	SSL
Location	Front
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes

## Inlet 2

Manufacturer	Agilent Technologies
Name	7690
Type	SSL
Location	Back
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes

## Detector 1

Manufacturer	Agilent Technologies
Name	7690
Type	FID
Adapter	Capillary
Control Type	Electronic Pressure Control (EPC)
Location	Front
Makeup Gas	Nitrogen

## Detector 2

Manufacturer	Agilent Technologies
Name	7690
Type	FID
Adapter	Capillary
Control Type	Electronic Pressure Control (EPC)
Location	Back
Makeup Gas	Nitrogen

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## Electronic Signature

## Purpose

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Full Name of Signer: Saenguthai Tarak  
Logged On User Name: saenguthai.tarak@non.agilent.com  
Signature Creation Date: April 21, 2023  
Reason for Signature: Executed protocol and published this original version of document

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User Name: saenguthai.tarak  
Hostname: LAPTOP-CQ35K0MY

System ID: CN11461066  
Print Date: April 21, 2023 3:26:40 PM

## GC-4\_BKK\_EN9127\_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:21:36 AM	Audit	SessionCreated	Session	None
April 21, 2023 11:21:36 AM	Start	Configuration	Session	None
April 21, 2023 11:21:36 AM	Audit	Enrollment	Licensing	User is Nonpaying and does not require an unlock code
April 21, 2023 11:22:04 AM	Audit	ExpLoaded	Session	EQP details for primary technique (S) - File path: [ProtocolPacks\Go\Configure\kowi02.53\Go.02.52.eqp] EQP File Name: [Go.02.52.eqp], EQP Name: [AgilentRecommendedProto col Revision (Go.02.52)]
April 21, 2023 11:22:06 AM	End	Configuration	Session	None
April 21, 2023 11:22:14 AM	Start	Qualification	Session	OQ
April 21, 2023 11:22:14 AM	Start	Execution	CDS Lagon Verification - GC	None - Qualitative test
April 21, 2023 11:23:14 AM	End	Execution	CDS Lagon Verification - GC	Run Count : 1 - Qualitative test
April 21, 2023 11:23:16 AM	Start	Execution	System Inspection and Basic Safety and Operation - 7890 -	None Qualitative Test - No setpoints associated
April 21, 2023 11:23:38 AM	End	Execution	System Inspection and Basic Safety and Operation - 7890 -	Run Count : 1 Qualitative Test - No setpoints associated
April 21, 2023 11:23:37 AM	Start	Execution	Inlet Pressure Decay - Front SSL - Pressure Controlled Inlet	None - S: 25.0 psi - L: <= -2.0 psi and <= 0.5 psi

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User Name: saenguthai.tarak  
Hostname: LAPTOP-CQ35K0MY

System ID: CN11461066  
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## GC-4\_BKK\_EN9127\_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:24:01 AM	End	Execution	Inlet Pressure Decay - Front SSL - Pressure Controlled Inlet	Run Count : 1 - S: 25.0 psi - L: <= -2.0 psi and <= 0.5 psi
April 21, 2023 11:24:04 AM	Start	Execution	Inlet Pressure Accuracy - Front SSL - Pressure Controlled Inlet	None - S: 25.0 psi - L: <= 1.2 psi
April 21, 2023 11:24:09 AM	End	Execution	Inlet Pressure Accuracy - Front SSL - Pressure Controlled Inlet	Run Count : 1 - S: 25.0 psi - L: <= 1.2 psi
April 21, 2023 11:24:11 AM	Start	Execution	Inlet Pressure Decay - Back SSL - Pressure Controlled Inlet	None - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi
April 21, 2023 11:24:43 AM	End	Execution	Inlet Pressure Decay - Back SSL - Pressure Controlled Inlet	Run Count : 1 - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi
April 21, 2023 11:24:45 AM	Start	Execution	Inlet Pressure Accuracy - Back SSL - Pressure Controlled Inlet	None - S: 25.0 psi - L: <= 1.2 psi
April 21, 2023 11:24:51 AM	End	Execution	Inlet Pressure Accuracy - Back SSL - Pressure Controlled Inlet	Run Count : 1 - S: 25.0 psi - L: <= 1.2 psi
April 21, 2023 11:24:52 AM	Start	Execution	Detector Flow Accuracy - Front FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:25:20 AM	Audit	Data	Detector Flow Accuracy - Front FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:25:35 AM	End	Execution	Detector Flow Accuracy - Front FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Run Count : 1

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User Name: saenguthai.tarak  
Hostname: LAPTOP-CQ35K0MY

System ID: CN11461066  
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## GC-4\_BKK\_EN9127\_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:25:26 AM	Start	Execution	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:25:40 AM	Audit	Data	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:25:42 AM	End	Execution	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 21, 2023 11:25:44 AM	Start	Execution	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:26:01 AM	Audit	Data	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:26:04 AM	End	Execution	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 21, 2023 11:26:06 AM	Start	Execution	Detector Flow Accuracy - Back FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:26:19 AM	Audit	Data	Detector Flow Accuracy - Back FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:26:22 AM	End	Execution	Detector Flow Accuracy - Back FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 21, 2023 11:26:24 AM	Start	Execution	Detector Flow Accuracy - Back FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:26:36 AM	Audit	Data	Detector Flow Accuracy - Back FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry

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User Name: saengulhal.larak  
Hostname: LAPTOP-CQ3SKOMVSystem ID: CN11461066  
Print Date: April 21, 2023 3:26:40 PM

GC-4\_BKK\_EN0127\_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:28:43 AM	End	Execution	Detector Flow Accuracy - Back FID - Type: Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Run Count: 1
April 21, 2023 11:28:45 AM	Start	Execution	Detector Flow Accuracy - Back FID - Type: Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:27:51 AM	Audit	Data	Detector Flow Accuracy - Back FID - Type: Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:27:05 AM	End	Execution	Detector Flow Accuracy - Back FID - Type: Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Run Count: 1
April 21, 2023 11:27:07 AM	Start	Execution	GC Oven Temperature Accuracy - 7890 - Temperature: Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 21, 2023 11:27:33 AM	Audit	Data	GC Oven Temperature Accuracy - 7890 - Temperature: Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
April 21, 2023 11:27:30 AM	End	Execution	GC Oven Temperature Accuracy - 7890 - Temperature: Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count: 1
April 21, 2023 11:27:37 AM	Start	Execution	GC Oven Temperature Accuracy - 7890 - Temperature: Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 21, 2023 11:27:54 AM	Audit	Data	GC Oven Temperature Accuracy - 7890 - Temperature: Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry

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GC-4\_BKK\_EN0127\_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:27:57 AM	End	Execution	GC Oven Temperature Accuracy - 7890 - Temperature: Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count: 1
April 21, 2023 11:27:59 AM	Start	Execution	GC Oven Temperature Stability - 7890 - Temperature: Oven - S: 100.0°C - L: <= 0.5°C	None
April 21, 2023 11:29:07 AM	Audit	Data	GC Oven Temperature Stability - 7890 - Temperature: Oven - S: 100.0°C - L: <= 0.5°C	Manual Data Entry
April 21, 2023 11:29:10 AM	End	Execution	GC Oven Temperature Stability - 7890 - Temperature: Oven - S: 100.0°C - L: <= 0.5°C	Run Count: 1
April 21, 2023 11:29:12 AM	Start	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID - Part of System Preparation - No limits associated	None
April 21, 2023 11:30:27 AM	Audit	Data	GC Scouting Run - Injection Tower, Front SSL, Front FID - Part of System Preparation - No limits associated	Data File Path: C:\Users\Public\Documents\C\hemStation3\Data\OQ_GC-4_ALS_2023-04-20\OQ_GC-4_2023-2023-04-20_14-36-08\FID1-D\FID1A.ch
April 21, 2023 11:31:04 AM	End	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID - Part of System Preparation - No limits associated	Run Count: 1
April 21, 2023 11:31:07 AM	Start	Execution	Noise and Drift - Front FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pA/hour	None

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GC-4\_BKK\_EN0127\_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:31:43 AM	Audit	Data	Noise and Drift - Front FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pA/hour	Data File Path: C:\Users\Public\Documents\C\hemStation3\Data\OQ_GC-4_ALS_2023-04-20\OQ_GC-4_2023-2023-04-20_14-36-08\FID1-D\FID1A.ch
April 21, 2023 11:32:00 AM	End	Execution	Noise and Drift - Front FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pA/hour	Run Count: 1
April 21, 2023 11:32:03 AM	Start	Execution	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	None
April 21, 2023 11:32:23 AM	Start	Execution	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	None
April 21, 2023 11:33:55 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data File Path: C:\Users\Public\Documents\C\hemStation3\Data\OQ_GC-4_ALS_2023-04-20\OQ_GC-4_2023-2023-04-20_14-36-08\FID1-D\FID1A.ch
April 21, 2023 11:33:55 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data File Path: C:\Users\Public\Documents\C\hemStation3\Data\OQ_GC-4_ALS_2023-04-20\OQ_GC-4_2023-2023-04-20_14-36-08\FID1-D\FID1A.ch

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GC-4\_BKK\_EN0127\_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:33:55 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data File Path: C:\Users\Public\Documents\C\hemStation3\Data\OQ_GC-4_ALS_2023-04-20\OQ_GC-4_2023-2023-04-20_14-36-08\FID1-D\FID1A.ch
April 21, 2023 11:33:55 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data File Path: C:\Users\Public\Documents\C\hemStation3\Data\OQ_GC-4_ALS_2023-04-20\OQ_GC-4_2023-2023-04-20_14-36-08\FID1-D\FID1A.ch
April 21, 2023 11:33:59 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data File Path: C:\Users\Public\Documents\C\hemStation3\Data\OQ_GC-4_ALS_2023-04-20\OQ_GC-4_2023-2023-04-20_14-36-08\FID1-D\FID1A.ch
April 21, 2023 11:35:05 AM	End	Execution	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Run Count: 1
April 21, 2023 11:35:04 AM	Start	Execution	Signal to Noise - Injection Tower, Front SSL, Front FID - Detector FID - L: >= 300000	None

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System ID: CN11461066

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User Name: saengulhal.sark  
Host Name: LAPTOP-CQ28KGMVSystem ID: CN11461066  
Print Date: April 21, 2023 3:26:40 PM

GC-6\_BKH\_EN0127\_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:25:28 AM	Audit	Data	Signal to Noise - Injection Tower, Front SSL, Front FID - Detector FID - L: => 300000	Data file Path: C:\Users\Public\Documents\C\hemStation3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023-04-20 14-36-08\B_Back.D\FID28.ch
April 21, 2023 11:26:00 AM	End	Execution	Signal to Noise - Injection Tower, Front SSL, Front FID - Detector FID - L: => 300000	Run Count: 1
April 21, 2023 11:26:03 AM	Start	Execution	GC Scouting Run - Injection Tower, Back SSL, Back FID - Part of System Preparation - No limits associated	None
April 21, 2023 11:26:36 AM	Audit	Data	GC Scouting Run - Injection Tower, Back SSL, Back FID - Part of System Preparation - No limits associated	Data file Path: C:\Users\Public\Documents\C\hemStation3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023-04-20 14-36-08\B_SCO1.D\FID28.ch
April 21, 2023 11:37:30 AM	End	Execution	GC Scouting Run - Injection Tower, Back SSL, Back FID - Part of System Preparation - No limits associated	Run Count: 1
April 21, 2023 11:37:32 AM	Start	Execution	Noise and Drift - Back FID - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	None

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User Name: saengulhal.sark  
Host Name: LAPTOP-CQ28KGMVSystem ID: CN11461066  
Print Date: April 21, 2023 3:26:40 PM

GC-6\_BKH\_EN0127\_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:38:06 AM	Audit	Data	Noise and Drift - Back FID - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Data file Path: C:\Users\Public\Documents\C\hemStation3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023-04-20 14-36-08\B-D1--0058.D\FID28.ch
April 21, 2023 11:38:23 AM	End	Execution	Noise and Drift - Back FID - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Run Count: 1
April 21, 2023 11:38:52 AM	Start	Execution	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	None
April 21, 2023 11:38:51 AM	Start	Execution	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	None
April 21, 2023 11:40:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data file Path: C:\Users\Public\Documents\C\hemStation3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023-04-20 15-37-32\Pre11--0048.D\FID28.ch
April 21, 2023 11:40:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data file Path: C:\Users\Public\Documents\C\hemStation3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023-04-20 15-37-32\Pre11--0058.D\FID28.ch

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Date: April 21, 2023 3:26:38 PM  
System ID: CN11461066

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User Name: saengulhal.sark  
Host Name: LAPTOP-CQ28KGMVSystem ID: CN11461066  
Print Date: April 21, 2023 3:26:40 PM

GC-6\_BKH\_EN0127\_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:40:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data file Path: C:\Users\Public\Documents\C\hemStation3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023-04-20 15-37-32\Pre11--0058.D\FID28.ch
April 21, 2023 11:40:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data file Path: C:\Users\Public\Documents\C\hemStation3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023-04-20 15-37-32\Pre11--0078.D\FID28.ch
April 21, 2023 11:40:21 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data file Path: C:\Users\Public\Documents\C\hemStation3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023-04-20 15-37-32\Pre11--0088.D\FID28.ch
April 21, 2023 11:40:21 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data file Path: C:\Users\Public\Documents\C\hemStation3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023-04-20 15-37-32\Pre11--0098.D\FID28.ch
April 21, 2023 11:41:29 AM	End	Execution	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Run Count: 1
April 21, 2023 11:41:33 AM	Start	Execution	Signal to Noise - Injection Tower, Back SSL, Back FID - Detector FID - L: => 300000	None

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Date: April 21, 2023 3:26:38 PM  
System ID: CN11461066

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User Name: saengulhal.sark  
Host Name: LAPTOP-CQ28KGMVSystem ID: CN11461066  
Print Date: April 21, 2023 3:26:40 PM

GC-6\_BKH\_EN0127\_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:42:22 AM	Audit	Data	Signal to Noise - Injection Tower, Back SSL, Back FID - Detector FID - L: => 300000	Data file Path: C:\Users\Public\Documents\C\hemStation3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023-04-20 14-36-08\B_Back.D\FID28.ch
April 21, 2023 11:42:50 AM	End	Execution	Signal to Noise - Injection Tower, Back SSL, Back FID - Detector FID - L: => 300000	Run Count: 1
April 21, 2023 11:42:53 AM	End	Qualification	Session	OQ
April 21, 2023 12:01:47 PM	Audit	Reporting	Session	None
April 21, 2023 3:16:07 PM	Audit	AcqClosed	Session	None
April 21, 2023 3:16:07 PM	Audit	AcqRestarted	Session	None
April 21, 2023 3:16:10 PM	Audit	SessionRelabeled	Session	None
April 21, 2023 3:20:59 PM	Audit	Qualification	Session	OQ
April 21, 2023 3:20:59 PM	Audit	AcqRestarted	Session	None
April 21, 2023 3:21:00 PM	Audit	SessionRelabeled	Session	None
April 21, 2023 3:21:07 PM	Start	Qualification	Session	OQ
April 21, 2023 3:25:48 PM	Audit	Reporting	Session	Report Generated Certificate

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Date: April 21, 2023 3:26:38 PM  
System ID: CN11461066

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### Calibration Certificate

Certificate No. 551422  
Product 200-510M Defender 510 Medium Flow  
Serial No. 208345  
Cal. Date 18-Aug-2023

Sold To:

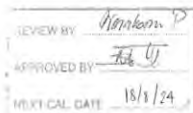
All calibrations are performed in accordance with ISO 17025 at Mesa Laboratories, Inc., 12100 W. 6th Ave, Lakewood, CO 80228, an ISO 17025:2017 accredited laboratory through NVLAP. This report shall not be reproduced except in full without the written approval of the laboratory. Results only relate to the items calibrated. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

### As Received Calibration Data

Technician		Lab. Pressure		Lab. Temperature	
Aaron Schwartz		620.1 mmHg		23.5 °C	
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Received	
4523.09 ccm	4519.02 ccm	0.09%	1.00%	In Tolerance	
999.43 ccm	999.31 ccm	0.01%	1.00%	In Tolerance	
245.22 ccm	245.88 ccm	-0.27%	1.00%	In tolerance	

### Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_24	205307	25-May-2023	25-May-2024



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### As Shipped Calibration Data

Certificate No		Lab. Pressure		Lab. Temperature	
551422		618.8 mmHg		24.2 °C	
Technician		Xiem Ly			
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Shipped	
4516.61 ccm	4515.56 ccm	0.02%	1.00%	In Tolerance	
1000.67 ccm	1000.67 ccm	0.02%	1.00%	In Tolerance	
249.84 ccm	249.93 ccm	-0.04%	1.00%	In Tolerance	

### Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_24	100439	14-Sep-2022	14-Sep-2023

### Calibration Notes

The expanded uncertainty of flow has a coverage factor of  $k = 2$  for a confidence interval of approximately 95%.  
Flow testing is in accordance with our test number MP-00672 with an expanded uncertainty of 0.27% using high-purity nitrogen or filtered laboratory air.  
Traceability to the International System of Units (SI) is verified by accreditation to ISO/IEC 17025 by NVLAP under NVLAP Code 200661-0.

### Technician Notes

By:

Approved By:

Xiem Ly  
Production Technician II

Norma Aragon  
QC Inspector

Mesa Laboratories, Inc. certifies that the above instrument meets or exceeds published specifications, and that the calibration results in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Calibration results are in compliance with ISO/IEC 17025:2017. Calibrations process has a Test Uncertainty Ratio (TUR) of 4:1 or greater. Any Pass/Fail determination is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only.

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### Calibration Certificate

Certificate No. 561587  
Product 200-510L Defender 510 Low Flow  
Serial No. 130026  
Cal. Date 25-Sep-2023

Sold To:

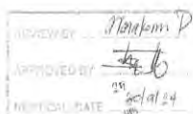
All calibrations are performed in accordance with ISO 17025 at Mesa Laboratories, Inc., 12100 W. 6th Ave, Lakewood, CO 80228, an ISO 17025:2017 accredited laboratory through NVLAP. This report shall not be reproduced except in full without the written approval of the laboratory. Results only relate to the items calibrated. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

### As Received Calibration Data

Technician		Lab. Pressure		Lab. Temperature	
Aaron Schwartz		515.1 mmHg		24 °C	
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Received	
0 ccm	455.41 ccm	-100.0%	1.00%	Out of Tolerance	
0 ccm	101.19 ccm	-100.0%	1.00%	Out of Tolerance	
0 ccm	30.36 ccm	-100.0%	1.00%	Out of Tolerance	

### Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_10	103743	25-Jan-2023	25-Jan-2024



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### As Shipped Calibration Data

Certificate No		Lab. Pressure		Lab. Temperature	
561587		622.2 mmHg		23.6 °C	
Technician		Aaron Schwartz			
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Shipped	
449.75 ccm	450.46 ccm	-0.16%	1.00%	In Tolerance	
100.96 ccm	100.82 ccm	0.14%	1.00%	In Tolerance	
30.63 ccm	30.38 ccm	0.82%	1.00%	In Tolerance	

### Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_10	103743	25-Jan-2023	25-Jan-2024

### Calibration Notes

The expanded uncertainty of flow has a coverage factor of  $k = 2$  for a confidence interval of approximately 95%.  
Flow testing is in accordance with our test number MP-00672 with an expanded uncertainty of 0.27% using high-purity nitrogen or filtered laboratory air.  
Traceability to the International System of Units (SI) is verified by accreditation to ISO/IEC 17025 by NVLAP under NVLAP Code 200661-0.

### Technician Notes

By:

Approved By:

Aaron Schwartz  
Assembler I

David Thomas  
Quality Engineer

Mesa Laboratories, Inc. certifies that the above instrument meets or exceeds published specifications, and that the calibration results in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Calibration results are in compliance with ISO/IEC 17025:2017. Calibrations process has a Test Uncertainty Ratio (TUR) of 4:1 or greater. Any Pass/Fail determination is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only.

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FM-00228 Rev. B





### Calibration Certificate

Certificate No. 561588  
Product 200-510M Defender 510 Medium Flow  
Serial No. 151114  
Cal. Date 30-Sep-2023

Sold To:

All calibrations are performed in accordance with ISO 17025 at Mesa Laboratories, Inc., 12100 W. 6th Ave, Lakewood, CO 80228, an ISO 17025:2017 accredited laboratory through NVLAP. This report shall not be reproduced except in full without the written approval of the laboratory. Results only relate to the items calibrated. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

### As Received Calibration Data

Technician	Xiem Ly	Lab. Pressure	616.8 mmHg	Lab. Temperature	25.8 °C
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Received	
0 ccm	4499.86 ccm	-100.0%	1.00%	Out of Tolerance	
0 ccm	997.36 ccm	-100.0%	1.00%	Out of Tolerance	
0 ccm	250.32 ccm	-100.0%	1.00%	Out of Tolerance	

### Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_24	117991	16-Aug-2023	16-Aug-2024



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### As Shipped Calibration Data

Certificate No	561588	Lab. Pressure	616.2 mmHg	
Technician	Xiem Ly	Lab. Temperature	26.1 °C	
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Shipped
4496.74 ccm	4494.43 ccm	0.05%	1.00%	In Tolerance
997.03 ccm	997.16 ccm	-0.01%	1.00%	In Tolerance
249.84 ccm	250.5 ccm	-0.26%	1.00%	In Tolerance

### Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_24	117991	05-Dec-2022	05-Dec-2023

### Calibration Notes

The expanded uncertainty of flow has a coverage factor of  $k = 2$  for a confidence interval of approximately 95%. Flow testing is in accordance with our test number MP-00572 with an expanded uncertainty of 0.27% using high-purity nitrogen or filtered laboratory air. Traceability to the International System of Units (SI) is verified by accreditation to ISO/IEC 17025 by NVLAP under NVLAP Code 200661-0.

### Technician Notes

By:

Xiem Ly  
Production Technician II

Approved By:

Norma Aragon  
QC Inspector

Mesa Laboratories, Inc. certifies that the above instrument meets or exceeds published specifications, and that the calibration results in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Calibration results are in compliance with ISO/IEC 17025:2017. Calibrations process has a Test Uncertainty Ratio (TUR) of 4:1 or greater. Any Pass/Fail determination is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only.

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FM-00228 Rev B

INNOVATIVE INSTRUMENT CALIBRATION LAB  
INNOVATIVE INSTRUMENT CO., LTD HEAD OFFICE  
7/19 MOO 13, SOI SUTSINAKORN 11 TAMBON BANG KATU  
AMPHUR BANG PHU (SAMUT PRAKAN PROVINCE) 10140 THAILAND  
TEL : 08-00-2116-5900 FAX : 08-00-2116-5140



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### Certificate of Calibration

Customer ALS Laboratory Group Thailand Co., Ltd.  
Name  
Address 104 Soi Phatthanasak 46, Phatthanasak Road, Suan Luang, Bangkok  
10250  
Request No : 24-AFM-018 Rev.1  
Request No : Req-2024-0043

### Unit Under Calibration Details

Measurement Item	Air Flow Meter	Sensor Model	
Manufacturer	Bios	Sensor Serial Number	
Model	Defender 510-1		
Serial Number	206895		
ID	BK_K_FSI346		

Location of Calibration LAB 4 AIR VELOCITY METER

### Calibration Environment and Details

Temperature	23 °C ± 3 °C
Humidity	55 %RH ± 20 %RH
Barometric Pressure	1013 hPa ± 10 hPa
Received Date	3 January 2024
Calibration Date	29 January 2024

Calibration Procedure In-house method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator

Reference Standard	Model	Serial Number	Traceable	Due Calibration
Air Flow Meter	Gilibrator 3 Low flow	18501010006	Sensodyne	12 July 2024
Air Flow Meter	Gilibrator 3 Standard flow	19031011003	Sensodyne	12 July 2024
Temperature meter	GT 11	08000057	Qcchom	27 February 2024
Pressure meter	CPQ2409	41000KDU-651802	TPA	9 November 2024

### Traceability :

This Certificate is traceable to SI Unit through Sensodyne AZLA Accreditation No. 3943-01

Note :

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor  $k = 2$ , providing a level of confidence approximately 95 %.

This Certificate was issued to replace to Calibration Certificate No. 24-AFM-018

Calibration By : Mr. Noppadol Luangart  
Service Calibration Engineer

Approved By : Mr. Pait Mathavorn  
Calibration Engineer Supervisor  
Issue Date : 1 February 2024

This results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev 01 Issue date 25/01/24

INNOVATIVE INSTRUMENT CALIBRATION LAB  
INNOVATIVE INSTRUMENT CO., LTD HEAD OFFICE  
7/19 MOO 13, SOI SUTSINAKORN 11 TAMBON BANG KATU  
AMPHUR BANG PHU (SAMUT PRAKAN PROVINCE) 10140 THAILAND  
TEL : 08-00-2116-5900 FAX : 08-00-2116-5140



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Certificate No : 24-AFM-018 Rev.1

Request No : Req-2024-0043

### Result of Calibration : Without Adjustment

Temperature	Pressure	STD	UUC	Error	Uncertainty
(°C)	(kPa)	(ml/min)	(ml/min)	(ml/min)	(ml/min)
23.00	101.66	20	20.148	0.1	1.3
25.00	101.67	100	99.409	-0.6	2.8
24.90	101.63	199	197.46	-1.5	5.6
25.00	101.61	300	298.15	-1.8	8.4
24.90	101.60	399	406.13	1	11
24.90	101.59	480	478.02	-2.0	8.8

Note

STD = Standard UUC = Unit Under Calibration

UUC Reference Condition : At atmospheric pressure and room temperature condition

Flow Rate was corrected for non-standard operating condition by using equation

$$Q_{meas} = Q_{ref} \times \frac{P_{ref}}{P_{meas}} \times \frac{T_{meas}}{T_{ref}}$$

where Q = Flow Rate P = Absolute Pressure T = Absolute Temperature  
Meas = Measurement Condition ref = Standard Condition

\* Indicates non accredited

End of Certificate

This results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev 01 Issue date 25/01/24

### Certificate of Calibration

**Customer**  
Name: ALS Laboratory Group Thailand Co., Ltd.  
Address: 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

**Certificate No:** 24-AFM-033  
**Request No:** Req-2024-0241

#### Unit Under Calibration Details

Measurement Item: Primary Flow Calibrator  
Manufacturer: Bios  
Model: Defender S10-L  
Serial Number: 130027  
ID: RYG\_FS0208

Sensor Model: -  
Sensor Serial Number: -

Location of Calibration: LAB 4 AIR VELOCITY METER

#### Calibration Environment and Details

Temperature: 23 °C ± 3 °C  
Humidity: 55 %RH ± 20 %RH  
Barometric Pressure: 1013 hPa ± 10 hPa  
Received Date: 31 January 2024  
Calibration Date: 13 February 2024  
Calibration Procedure: In-house method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator



Reference Standard	Model	Serial Number	Traceable	Due Calibration
Air Flow Meter	Gilibrator 3 Low flow	18501010006	Sensidyne	12 July 2024
Air Flow Meter	Gilibrator 3 Standard flow	19031011003	Sensidyne	12 July 2024
Temperature meter	GT 11	08000057	Oreborn	27 February 2024
Pressure meter	CPG2400	41000KDU/651882	TPA	9 November 2024

#### Traceability:

This Certificate is traceable to SI Unit through Sensidyne A2LA Accreditation No. 3943.01

#### Note:

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor  $k = 2$ , providing a level of confidence approximately 95 %.

**Calibration By:** Mr. Noppadol Luangert  
Service Calibration Engineer

**Approved By:** Mr. Panch Mathavorn  
Calibration Engineer Supervisor  
**Issue Date:** 13 February 2024

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev 01 Issue date 25/01/24

**Certificate No:** 24-AFM-033  
**Request No:** Req-2024-0241

#### Result of Calibration: Without Adjustment

Temperature (°C)	Pressure (kPa)	STD (cc/min)	UUC (cc/min)	Error (cc/min)	Uncertainty (cc/min)
24.50	101.26	20	19.965	0.0	1.3
24.20	101.25	101	100.50	-0.5	2.8
24.00	101.31	200	199.13	-0.9	5.6
23.90	101.42	301	303.56	2.6	8.4
24.10	101.41	401	404.57	4	11
24.10	101.49	480	483.81	3.8	7.0

#### Note

STD: Standard UUC: Unit Under Calibration

UUC Reference Condition: At atmospheric pressure and room temperature condition

Flow Rate was corrected for non-standard operating condition by using equation:

$$Q_{meas} = Q_{ref} \times \frac{P_{ref}}{P} \times \frac{T_{meas}}{T_{ref}}$$

where  $Q$  = Flow Rate  $P$  = Absolute Pressure  $T$  = Absolute Temperature  
Meas = Measurement Condition ref = Standard Condition

\* Indicates non accredited

End of Certificate

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev 01 Issue date 25/01/24

### Certificate of Calibration

**Customer**  
Name: ALS Laboratory Group Thailand Co., Ltd.  
Address: 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

**Certificate No:** 24-AFM-032  
**Request No:** Req-2024-0240

#### Unit Under Calibration Details

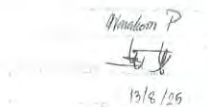
Measurement Item: Primary Flow Calibrator  
Manufacturer: Bios  
Model: Defender S10-M  
Serial Number: 129958  
ID: RYG\_FS0209

Sensor Model: -  
Sensor Serial Number: -

Location of Calibration: LAB 4 AIR VELOCITY METER

#### Calibration Environment and Details

Temperature: 23 °C ± 3 °C  
Humidity: 55 %RH ± 20 %RH  
Barometric Pressure: 1013 hPa ± 10 hPa  
Received Date: 31 January 2024  
Calibration Date: 13 February 2024  
Calibration Procedure: In-house method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator



Reference Standard	Model	Serial Number	Traceable	Due Calibration
Air Flow Meter	Gilibrator 3 Low flow	18501010006	Sensidyne	12 July 2024
Air Flow Meter	Gilibrator 3 Standard flow	19031011003	Sensidyne	12 July 2024
Temperature meter	GT 11	08000057	Oreborn	27 February 2024
Pressure meter	CPG2400	41000KDU/651882	TPA	9 November 2024

#### Traceability:

This Certificate is traceable to SI Unit through Sensidyne A2LA Accreditation No. 3943.01

#### Note:

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor  $k = 2$ , providing a level of confidence approximately 95 %.

**Calibration By:** Mr. Noppadol Luangert  
Service Calibration Engineer

**Approved By:** Mr. Panch Mathavorn  
Calibration Engineer Supervisor  
**Issue Date:** 13 February 2024

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev 01 Issue date 25/01/24

**Certificate No:** 24-AFM-032  
**Request No:** Req-2024-0240

#### Result of Calibration: Without Adjustment

Temperature (°C)	Pressure (kPa)	STD (cc/min)	UUC (cc/min)	Error (cc/min)	Uncertainty (cc/min)
23.80	101.89	95	100.13	5.1	2.8
23.90	101.71	501	513.93	12.9	7.2
24.18	101.62	1006	1019.3	13	14
24.00	101.81	1997	2023.0	26	29
24.10	101.87	2999	3035.5	37	45
24.60	102.00	3944	3991.8	48	59
24.60	102.08	4739	4790.5	52	72

#### Note

STD: Standard UUC: Unit Under Calibration

UUC Reference Condition: At atmospheric pressure and room temperature condition

Flow Rate was corrected for non-standard operating condition by using equation:

$$Q_{meas} = Q_{ref} \times \frac{P_{ref}}{P} \times \frac{T_{meas}}{T_{ref}}$$

where  $Q$  = Flow Rate  $P$  = Absolute Pressure  $T$  = Absolute Temperature  
Meas = Measurement Condition ref = Standard Condition

\* Indicates non accredited

End of Certificate

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev 01 Issue date 25/01/24



# CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc  
DATE OF ISSUE 29 January 2024 CERTIFICATE NUMBER 207436

REVIEW BY *Nathan P*  
APPROVED BY *[Signature]*  
EFFECTIVE DATE 28/1/25

Cirrus Research plc  
Acoustic House  
Bridlington Road  
Hunmanby  
North Yorkshire  
YO14 0PH  
United Kingdom

Page 1 of 2  
Approved signatory  
N.Smith  
Electronically signed:  
*[Signature]*

## doseBadge Reader : IEC 60942:2003

### Instrument Information

Manufacturer: Cirrus Research plc  
Model: RC110A  
Serial number: 89107  
Class: 2

### Notes:

### Test summary

Date of calibration: 29 January 2024

The doseBadge reader detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942\_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

The doseBadge Reader has been shown to conform to the Class 2 requirements for periodic testing, described in Annex B of IEC 60942:2003 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

However, as public evidence was not available, from a testing organisation responsible for pattern approval, to demonstrate that the model of doseBadge Reader conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, no general statement or conclusion can be made about conformance of the doseBadge Reader to the requirements of IEC 60942:2003.

### Notes:

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

# CERTIFICATE OF CALIBRATION

Certificate Number:  
207436  
Page 2 of 2

### Environmental conditions

The following conditions were recorded at the time of the test:

Before Pressure: 101.41 kPa Temperature: 21.2 °C Humidity: 37.1 %  
After Pressure: 101.41 kPa Temperature: 21.2 °C Humidity: 37.4 %

### Test equipment

Equipment	Manufacturer	Model	Serial number
Distortion Meter	Keithley	2015	0994818
Acoustic Calibrator	Brüel & Kjær	4231	2610257
Environmental Monitor	Comet	T7510	21962628

### Initial Acoustic Results

	Expected	Sample 1	Sample 2	Sample 3	Average	Deviation	Tolerance	Uncertainty
Level (dB)	114.00	113.55	113.54	113.54	113.54	-0.46	±0.75	0.11 dB
Distortion (%)	< 4.00	0.43	0.45	0.42	0.44	0.44	+4.00	0.13 %
Frequency (Hz)	1000.0	1002.3	1002.3	1002.3	1002.3	2.3	±20.0	0.1 Hz

The measured quantities or deviations (as applicable), extended by the expanded combined uncertainty of measurement, must not exceed the corresponding tolerance.

### Adjusted Acoustic Results

	Expected	Sample 1	Sample 2	Sample 3	Average	Deviation	Tolerance	Uncertainty
Level (dB)	114.00	113.98	114.01	114.01	114.00	0.00	±0.75	0.11 dB
Distortion (%)	< 4.00	0.33	0.34	0.33	0.33	0.33	+4.00	0.13 %
Frequency (Hz)	1000.0	1002.3	1002.3	1002.3	1002.3	2.3	±20.0	0.1 Hz

### Functionality Results

Function	Result
Keypad	Pass
Battery Power	Pass
Display	Pass
Communication	Pass
2 way IR link	Pass
Clock	Pass

End of results

## SITHIPORN ASSOCIATES CO., LTD. CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangkok, 10700 Thailand  
Tel : +66 2433 8331 Email : calibration@sithiporn.com

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Cert. No. : ACC24008  
Pages : 1 of 3

## Calibration Certificate

Equipment : SOUND CALIBRATOR  
Manufacturer : RION  
Model : NC-75  
Serial No.: 35002736  
ID No.: RYG\_FS0496

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,  
KHAENG PHATTHANAKAN, KHET SUAN LUANG,  
BANGKOK, 10250 THAILAND.

Location :  
Ambient Temperature : ( 23.0 ± 3 ) °C  
Pressure : ( 101.3 ± 3 ) kPa  
Relative Humidity : ( 50.0 ± 20 ) %

Received Date : 19 JANUARY 2024  
Calibration Date : 26 JANUARY 2024  
Date of Issue : 29 JANUARY 2024

Calibrated by : Nathakorn Pisutpaisan

Approved by : *[Signature]*  
( Thanakul Petchurui )

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.

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Cert. No. : ACC24008  
Job No. : VC67AC0058  
Pages : 2 of 3

Calibration Procedure : CP-AC-03

### Calibration Method :

This equipment was calibrated by follow on IEC-60942:2003 Standard.

The sound pressure level, frequency and total distortion of the sound calibrator was measured using the reference microphone.

### Condition of this result of calibration :

#### 1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33511B	MY52302742	EF-0010-23	07-FEB-24
Digital Multimeter	33461A	MY53220104	EEL-BP 30/0266	13-FEB-24
Digital Multimeter	33461A	MY53220076	EEL-BP 30/0267	13-FEB-24
Digital Multimeter	33461A	MY60024273	EEL-BP 31/0266	14-FEB-24
Programmable Attenuator	MAT-1070	62100114	EF-0011-23	08-FEB-24
Condenser Microphone	4180	2977900	AA-1001-23	14-FEB-24
Measuring Amplifier	NA-42KA1	34560495	AA-3002-23	14-FEB-24
Audio Analyzer	AVR-3360A	V744B6069	EF-0012-23	10-FEB-24

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).

*[Signature]*

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CALIBRATION LABORATORY

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Cert. No. : ACC24008  
Job No. : VC67AC0058  
Pages : 3 of 3

Result of calibration :

1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Acceptance limit (dB)
94	93.98	-0.02	0.14	0.40

2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Acceptance limit (%)
1000	1000.0	0.0	0.1	1.0

3. Total distortion

Measured value (%)	Uncertainty (%)	Acceptance limit (%)
0.83	0.10	3.0

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor  $k = 2$   
or any value following calculation, providing a level of confidence of approximately 95 %

End of Calibration Certificate

T. Petchur

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Cert. No. : ACL24090  
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RJON  
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24  
Serial No. : 00233183 / 144835 / 23230  
ID No. : RYG\_FS0024

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,  
KHWAENG PHATTHANAKAN, KHET SUAN LUANG,  
BANGKOK, 10250 THAILAND.

Location :  
Ambient Temperature : ( 23.0  $\pm$  3 ) °C  
Pressure : ( 101.3  $\pm$  3 ) kPa  
Relative Humidity : ( 50.0  $\pm$  20 ) %

Received Date : 19 JANUARY 2024  
Calibration Date : 25-26 JANUARY 2024  
Date of issue : 29 JANUARY 2024

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchur  
( Thanakul Petchurai )

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced  
other than in full, except with the prior written approval of the head of Calibration Laboratory.

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Cert. No. : ACL24090  
Job No. : VC67AC0058  
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).  
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference  
Standard Instruments.  
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-23	07-FEB-24
Waveform Generator	33511B	MY52302742	EF-0010-23	07-FEB-24
Digital Multimeter	33461A	MY53220104	EEL_BP 30/0266	13-FEB-24
Digital Multimeter	33461A	MY53220076	EEL_BP 29/0266	13-FEB-24
Digital Multimeter	34461A	MY60024273	EEL_BP 31/0266	14-FEB-24
Programmable Attenuator	MAT-1070	62100114	EF-0011-23	08-FEB-24
Condenser Microphone	4180	2977900	AA-1001-23	14-FEB-24
Measuring Amplifier	NA-42KAJ	34560495	AA-3002-23	14-FEB-24

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

T. Petchur

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Job No. : VC67AC0058  
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Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	-	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

T. Petchur



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**Result of calibration :**

**1. Absolute sensitivity**

Reference Acoustic Signal ( dB )	Measured Value ( dB )	Deviation ( dB )	Acceptance Limit ( dB )
93.9 (93.98)	93.9	0.0	±0.3

**2. Self-generated noise**

**2.1 Normal test**

Measured Value ( dB )
18.3

**2.2 The microphone of the sound level meter was replaced by electrical signal input device.**

Frequency Weighting	Measured value ( dB )
A - weight	14.2
C - weight	20.0
Flat	25.6

**3. Acoustical signal tests of frequency weightings**

Meter free-field acoustic response at a level of 84 dB

Frequency ( Hz )	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.2	0.2	± 1.5
1000	0.1	0.1	0.1	± 1.0
8000	0.3	0.3	0.3	±5.0

*T. Petch.*

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**4. Electrical signal tests of frequency weightings**

Weighting network response with relative to 1 kHz.

Frequency ( Hz )	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

**5. Frequency and time weightings at 1 kHz**

**5.1 Frequency weightings at 1 kHz**

Frequency Weighting	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

**5.2 Time weighting at 1 kHz**

Frequency Weighting	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

**6. Long - term stability**

Frequency Weighting	SLM Display at initial ( dB )	SLM Display at final ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	94.0	94.0	0.0	± 0.3

*T. Petch.*

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**7. Level linearity on the reference level range**

Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.1	0.1	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.1	0.1	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.1	0.1	± 1.1
30.0	30.1	0.1	± 1.1
29.0	29.2	0.2	± 1.1
28.0	28.3	0.3	± 1.1
27.0	27.3	0.3	± 1.1
26.0	26.4	0.4	± 1.1
25.0	25.4	0.4	± 1.1

*T. Petch.*

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Job No. : VC67AC0058  
Pages : 7 of 8

**8. Level linearity including the level range control**

Range	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Auto	94.0	94.0	0.0	±1.1

**9. Tone burst response**

Time Weighting	Tone burst duration, Tb ( ms )	Cycle	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
SEL	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

**10. Peak C sound level**

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value, L <sub>peak</sub> ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Continuous	133.0	133.0	0.0	±3.0
One	136.4	135.7	-0.7	±3.0

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

*T. Petch.*

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Cert. No. : ACL24090  
Job No. : VC67AC0058  
Pages : 8 of 8

**11. Overload indication**

Measured value ( dB )		Deviated Value ( dB )	Acceptance Limits ( dB )
Positive one-half cycle	Negative one-half cycle		
89.5	89.5	0.0	±1.5

**12. High level stability**

Frequency	SLM Display at initial ( dB )	SLM Display at final ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Weighting				
A - weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor  $k = 2$  or any value following calculation, providing a level of confidence of approximately 95 %

End of Calibration Certificate

*Signature*



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250  
TEL: 0-2717-3000-24 FAX: 0-2719-9184



**Certificate of Calibration**

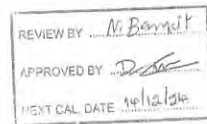
Certificate No. : 23E3824  
Page : 1 of 2

Equipment : pH Meter  
Manufacturer : Mettler Toledo  
Model : SevenExcellence  
Serial No. : B834291445  
ID No. : RYG\_EN0152  
Condition As-Received: Used Item  
Received Date : 06 December 2023  
Calibration Date : 14 December 2023  
Reference : 2312-0151DSC Submitted by : ALS Laboratory Group (Thailand) Co., Ltd. Rayong Branch  
Ambient Temperature : ( 23 ± 2 ) °C  
Relative Humidity : ( 50 ± 10 ) %  
616/10 Moo 5, T.Maenam Khu, A.Pluakdaeng, Rayong 21140, Thailand  
Procedure used: Calibration were conducted using calibration procedure No. CP-E17 according to EURAMET cg-15

**Condition of this result of calibration**

- Reference standards instruments :
 

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Multi-Product Calibrator	5502A	2435802	EE-0041-23	26 Apr 2024
- This result of calibration was made on requested at the point specified by customer.
- The certificate is valid only to the item calibrated on date and place of calibration.
- This Certification is traceable to the International System of Unit maintained through:-  
-National Institute of Metrology Thailand (NIMT)



Calibrated by : Napachanok Prasomsosini  
Issue Date : 15 December 2023  
Approved Signatory :  
[ ] Phalinee Prabpai  
[x] Nuntawat Khamchai  
[ ] Pongsagorn Boonyaporn

B 0331106



Cert. No.: 23E3824  
Page.: 2 of 2

**Result of calibration:-** ( \* ) Without adjustment ( ) After adjustment

Function: DC voltage measurement		Range:	2000 mV	
Standard Value	UUC* Reading		Error	Uncertainty
( mV )	( mV )		( mV )	( ± μV )
-200.0000	-199.9		0.1	68
-150.0000	-150.0		0.0	65
-100.0000	-100.0		0.0	63
-50.0000	-50.0		0.0	61
0.0000	0.0		0.0	58
50.0000	50.0		0.0	61
100.0000	100.0		0.0	63
150.0000	150.0		0.0	65
200.0000	199.9		-0.1	68

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a level of confidence of approximately 95 %

UUC\*= Unit Under Calibration.

-000-

a 1193422



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534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250  
TEL: 0-2717-3000-29 FAX: 0-2719-9344



Cert.No.: 23CH1574  
Page.: 1 of 3

**Certificate of Calibration**

Equipment : pH Meter  
Manufacturer : Mettler Toledo  
Model : SevenExcellence  
Serial No. : B834291445  
ID No. : RYG\_EN0152  
Condition As-Received: Used Item  
Received Date : 08 December 2023  
Calibration Date : 15 December 2023  
Reference : 2312-0151DSC-3  
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd. Rayong Branch  
616/10 Moo 5, T.Maenam Khu, A.Pluakdaeng, Rayong 21140, Thailand  
Ambient Temperature : (25 ± 2.5) °C  
Relative Humidity : (50 ± 15) %  
Calibration Procedure :  
In - house method  
- CP-CH5 by direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM)  
- CP-CH6 by comparison with standard thermometer

Calibrated by : Warakorn Lemgagrakul

Approved by :  
*Signature*  
Approved Signatory

( ) Salthip Meangmai  
( ) Warakorn Lemgagrakul  
(x) Ponpan Palpim

Issue Date : 19 December 2023

The Uncertainties are for a confidence probability of approximately 95%

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A 0061696





Cert.No.: 23CH1574  
Page.: 2 of 3

#### Condition of this calibration result

##### 1. Reference Standard Instrument :-

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	23E2802	27 Aug 2024
2) Ref. Standard Thermometer	4982054	110RC044	23I906	26 July 2024

This certification is traceable to the International System of Unit maintained through:-  
- Technology Promotion Association (Thailand-Japan)

##### 2. Certified Reference Materials :- The measurement results are traceable to SI through CPA chem Ltd., ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	913598	14 July 2025
pH 6.986	CPA chem	931959	01 Oct 2024
pH 9.987	CPA chem	940105	02 Nov 2024

##### 3. This certificate is valid only to the item calibrated on date and place of calibration.

#### Calibration Results

##### Function : mV Measurement

##### Performing standard curve by Fluke at pH (4,7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input		Actual Reading		Uncertainty of Measurement (mV)	Coverage factor k
	pH	mV	mV	pH			
	pH Meter S/N.: B834291445	4.000	177.48	177.3	4.000	0.058	2.00
	7.000	0.00	-0.1	7.000	0.058	2.00	
	10.000	-177.48	-177.5	10.000	0.058	2.00	

a 1193852



Cert.No.: 23CH1574  
Page.: 3 of 3

#### Calibration Results

##### Function : pH Measurement

##### Performing three buffers standard curve by using buffer nominal pH (4,7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH measurement (±)	Coverage factor k
pH Electrode S/N.: 3225368	4.008	4.013	184.1	0.0045	2.00
	6.986	6.988	8.7	0.0084	2.00
	9.987	10.002	-164.7	0.0088	2.11

##### Function : Temperature Measurement

##### (\*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : InLab®Expert Pro-ISM  
- Serial No. : 3225368

Dimension of probe;

- Length : 120 mm  
- Diameter : 12 mm  
- Immersion Depth : 100 mm

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
25.0	25.003	24.3	-0.703	0.13	2.00

Remark : - UUC\* = Unit Under Calibration

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k, providing a level of confidence of approximately 95 %.

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a 1193851



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES  
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250  
TEL 0-2717-3000 FAX: 0-2719-9484

Cert.No.: 23TW168  
Page.: 1 of 2

## Certificate of Testing

Equipment : DO Meter  
Manufacturer : YSI  
Model : 5000-115V  
Serial No. : 15E102796  
ID No. : RYG\_EN0032  
Received Date : 21 July 2023  
Test Date : 24 July 2023  
Reference : 2307-0713DSC-1  
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.  
Rayong Branch  
616/10 Moo 5, T.Maenam Khu, A.Pluakdaeng,  
Rayong 21140, Thailand  
Laboratory Condition : Temperature (25 ± 5) °C  
Humidity (50 ± 20) %  
Test Procedure : In-house method : CP-CH9  
by Comparison Technique with Azide Modification Method  
Tested by : Walalak Sirithean  
Approved by :   
Approved Signatory  
( ) Makoe Butkruea  
(x) Sathip Meangmai  
( ) Warakorn Lemgagrakul

Issue Date : 26 July 2023

B 0320211



Cert.No.: 23TW168  
Page.: 2 of 2

#### Condition of this result of calibration

##### 1. Reference Standard Instruments :-

This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1) Burette	-	130BU10	23CG1172	22 Mar 2025
2) Balance	1128143784	140RC004	22MM50	20 Sep 2023

##### 2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate pentahydrate	Merck	AM1763316	100.2%

##### Result : Dissolved Oxygen Meter Adjustment With Air 100 %

Dissolved Oxygen Probe No.: 15E100464

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.18	8.17	0.0055

This report was certified only for the instrument we tested. It is allowable to use for study the system efficiency. The environmental impact control and present to organization it may concerned intend to use for advertising and referral purpose is prohibited. This report may not be reproduced other in full, without written approval of the laboratory.

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a 1172155



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TEL. 0-2717-3000-29 FAX. 0-2719-9484



Cert. No.: 23LM125  
Page.: 1 of 2

## Certificate of Calibration

Equipment : DO Meter with Sensor  
Manufacturer : YSI  
Model : 5000-115V  
Serial No. : 15E102795  
ID No. : RYG\_EN0032  
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.  
Rayong Branch  
616/10 Moo 5 T. Maenam Khu, A. Pluakdaeng,  
Rayong 21140 Thailand  
Location : TPA On Site Calibration Laboratory  
Received Order : 25 July 2023  
Calibrated Date : 27 July 2023  
Ambient Temperature : ( 26 ± 10 ) °C  
Relative Humidity : ( 50 ± 30 ) %  
AC Line Voltage : ( 220 ± 22 ) V

Calibrated by : Preecha Hlahib

Approved by :   
Approved Signatory

( ) Pornthippa Tameyakul  
( ) Malee Bulkruea  
(✓) Suwit Imjai

Issue Date : 31 July 2023

The Uncertainties are for a confidence probability of approximately 95%

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Approval of the head of Corporate Services & Equipment Calibration and Testing Services.

A 0053616



Equipment : DO Meter with Sensor  
Condition As-Received : Used Item  
Reference : 2307-0713DSC-2

Cert. No.: 23LM125  
Page.: 2 of 2

### Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer ( IPRT ) into Temperature Bath.  
The temperature scale used was based on ITS-90.

### Condition of this result of calibration

#### 1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Digital Thermometer	2188080	221285	TPA	21 Oct 2023

2. This certificate is valid only to the item calibrated on date and place of calibration.

3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association ( Thailand - Japan )

Result of Calibration :- ( \* ) Without Adjustment

Function : Temperature measurement.

This instrument was connected with : temperature sensor, S/N.: 1228475367

Calibration Point ( °C )	Immersion Depth ( mm )	Standard Temperature ( °C )	UUC* Reading ( °C )	Error ( °C )	Uncertainty ( ± °C )	Coverage Factor k
20.00	100	20.011	19.91	-0.101	0.15	2.00

UUC\* : Unit Under Calibration

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k*, providing a level of confidence of approximately 95 %.

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a 1159515



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
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TEL. 0-2717-3000-29 FAX. 0-2719-9484



Cert. No.: 23TM962  
Page : 1 of 3

## Certificate of Calibration

Equipment : Low Temp. Incubator  
Manufacturer : Memmert  
Model : IPP750  
Serial No. : V818.0084  
ID No. : RYG\_EN0154  
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.  
(Rayong Branch)  
616/10 Moo 5 T. Maenam Khu,  
A. Pluakdaeng, Rayong 21140 Thailand  
Location : BOD Room  
Received Order : 29 May 2023  
Calibration Date : 29 May 2023  
Ambient Temperature : ( 26 ± 10 ) °C  
Relative Humidity : ( 50 ± 30 ) %

Calibrated by : Man Pattanapongpaiboon

Approved by :   
Approved Signatory

( ) Pornthippa Tameyakul  
( ) Malee Bulkruea  
(✓) Suwit Imjai

Issue Date : 7 June 2023

The Uncertainties are for a confidence probability of approximately 95%

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Approval of the head of Corporate Services & Equipment Calibration and Testing Services.

A 0054967



Equipment : Low Temp. Incubator  
Condition As-Received : Used Item  
Reference : 2305-0898OC-2

Cert. No.: 23TM962  
Page : 2 of 3

### Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector ( RTD ).

The temperature scale used was based on ITS-90.

### Condition of this result of calibration

#### 1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34972A	MY57013711	22LM93	02 Jul 2023

2. This certificate is valid only to the item calibrated on date and place of calibration.

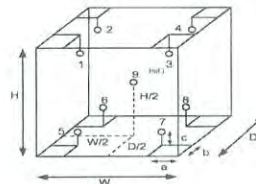
3. This certification is traceable to the International System of Unit.

Result of Calibration :- ( \* ) Without Adjustment

Function of UUC\* : Temperature Source

Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. ( °C )	23	23
REL Humid. ( % )	54	56
AC Supply ( Volt )	223	222



#### Probe Installation Details :

a = 10 cm	D = 0.60 m
b = 10 cm	W = 1.0 m
c = 10 cm	H = 1.2 m
	Capacity = 0.75 m <sup>3</sup>

Position :	Ref. Std. ID No.:
1	18-18RTD-01
2	18-18RTD-02
3	18-18RTD-03
4	18-18RTD-04
5	18-18RTD-05
6	18-18RTD-10
7	18-18RTD-07
8	22-18RTD-08
9 (ref.)	18-18RTD-09

a 1165130





Equipment : Low Temp. Incubator  
Condition As-Received : Used Item  
Reference : 2305-0898OC-2  
Result of Calibration : ( ) Without Adjustment  
Function of UUC\* : Temperature Source  
Fresh air setting : Close

Cert. No.: 23TM962  
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
20.0	20.0	20.0	0.019	0.72	1.0	2

Calibration Point (°C)	Measured Temperature (°C)	Uncertainty (°C)
Position		
1	19.547	0.30
2	19.780	
3	19.487	
4	19.529	
5	19.408	
6	20.139	
7	20.112	
8	20.406	
9 (ref.)	20.116	

Average\* : The average of 30 values in each position.  
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.  
Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.  
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation UUC\* : Unit Under Calibration  
Note : The reported uncertainty of measurement was included stability and excluded uniformity.

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k, providing a level of confidence of approximately 95 %.

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a 1165129

Sartorius (Thailand) Co., Ltd.  
129 Rama 9 Road, Huayfong, Huayfong, Bangkok 10310  
Tel : +66 2643 8361-6 Fax : +66 2643 8367, e-mail : service.thailand@sartorius.com



NSC-TIS-TIS 17035  
CALIBRATION 0426

SARTORIUS

# Certificate of Calibration

REVIEW BY : *Thantak*  
APPROVED BY : *D*  
NEXT CAL. DATE : 02/02/2025

Model Number : MSE224S-100-DU  
Description : Analytical Balance  
Serial Number : 0026207038  
ID No. : RYG\_EN0002  
Manufacturer : Sartorius  
Certificate No. : 24BCI0069  
Issued Date : Friday, February 23, 2024  
Reference No. : 229196  
Page No. : 1 of 2

Customer Name : ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)  
616/10 Moo 5 T. Maenam Khu, A. Pluak Daeng, Rayong 21140, Thailand.

Calibrated Place : ALS Laboratory Group (Thailand) Co., Ltd. (Balance Room)  
616/10 Moo 5 T. Maenam Khu, A. Pluak Daeng, Rayong 21140, Thailand.

Calibrated By : Mr. Chonchai Inthana  
Calibration Date : Thursday, February 22, 2024

Calibration Procedure No. : This calibration was conducted by Using in-house calibration procedure number (WI-003) Based on UKAS LAB 14 : 2019

Metrological data : Capacity : 220 g Readability : 0.0001 g  
Reasons for calibration : ☐ New Installation ☐ Service / Repair ☒ Re-calibration/ Maintenance  
Ambients Conditions : Temperature : 24.2 °C ± 5.0 °C Humidity : 57.0 % RH ± 10.0 % RH Pressure : ± Fair  
Equipment Condition : ☒ Good Operate ☐ Fair

Measurement Method : UKAS Publication Ref : Lab 14  
The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM). The calibration certificate documents the traceability to National Standards, which realise the unit of measurement according to the International Standard System of Units (SI). Report of Tolerance came from list of Sartorius Metrological Specifications.

## Traceability:

Model Number	Description	Traceability	Certificate No.	Due Date
YCS011-522-00	Sartorius weight set 1mg - 5000g E2, YCS011-522-00	TCS	M23081975	23-Aug-2025
MHB-382SD	Humidity/Barometer Temp Lutron MHB-382SD	DKSH	C19231645	23-Aug-2024

This certificate relate and apply this equipment only.  
This certificate may not be reproduced other than in full except with the prior written approval of the Verification Operation Division  
Sartorius (Thailand) Co., Ltd.

SOP FM 33 03 February 2022  
Mr. Chonchai Inthana (Technical Manager)



Sartorius (Thailand) Co., Ltd.  
129 Rama 9 Road, Huayfong, Huayfong, Bangkok 10310  
Tel : +66 2643 8361-6 Fax : +66 2643 8367, e-mail : service.thailand@sartorius.com

SARTORIUS

# Certificate of Calibration

Model Number : MSE224S-100-DU  
Description : Analytical Balance  
Serial Number : 0026207038  
ID No. : RYG\_EN0002  
Manufacturer : Sartorius  
Certificate No. : 24BCI0069  
Issued Date : Friday, February 23, 2024  
Reference No. : 229196  
Page No. : 2 of 2

## Calibration Results : Without Adjustment

Repeatability	Eccentricity (Off-center loading error)
The reproducibility is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.	The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of maximum capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R76).
Nominal Value : (Low Load) 20 g Tolerance 0.0001 g	Nominal value : 100 g Tolerance 0.0004 g
Nominal Value : (High Load) 200 g Tolerance 0.0001 g	Difference 1 - 2 -0.0001 3 -0.0001 4 0.0000 5 -0.0001 6 -
Standard Deviation 0.00007 0.00006	

Linearity

The linearity, also called linearity error, describes the deviation of the characteristic curve of a weighing instrument from the linear slope.

Tolerance 0.0002 g

Nominal Value (g)	Conventional Mass Value (g)	Displayed Value (g)	Deviation (g)	Uncertainty (g)
0.01	0.0100	0.0100	0.0000	0.00018
0.05	0.0500	0.0500	0.0000	0.00018
0.1	0.1000	0.1000	0.0000	0.00018
0.5	0.5000	0.5000	0.0000	0.00018
1	1.0000	1.0000	0.0000	0.00018
5	5.0000	5.0000	0.0000	0.00018
10	10.0000	10.0000	0.0000	0.00018
20	20.0000	20.0000	0.0000	0.00024
50	50.0000	49.9999	-0.0001	0.00019
100	100.0000	100.0000	0.0000	0.00023
200	200.0000	199.9999	-0.0001	0.00032

End of Report.

SOP FM 33 03 February 2022



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
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TEL 0-2717-3000-29 FAX 0-2719-9484



## Certificate of Calibration

Cert. No.: 24TM632  
Page : 1 of 3

Equipment : Hot Air Oven  
Manufacturer : Memmert  
Model : UFE 500  
Serial No. : G511.1572  
ID No. : RYG\_EN0010  
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)  
616/10 Moo 5 T. Maenam Khu, A. Pluak Daeng, Rayong 21140 Thailand  
Location : Oven Room  
Received Order : 21 March 2024  
Calibration Date : 21 March 2024  
Ambient Temperature : (26 ± 1) °C  
Relative Humidity : (50 ± 3) %  
Calibrated by : Man Pattanapongpaiboon  
Approved by : *Thantak*  
Approved Signatory  
( ) Pomthippa Tameyakul  
( ) Unnopphol Harachai  
(✓) Suwit Imjai  
Issue Date : 22 March 2024

The Uncertainties are for a confidence probability of approximately 95%

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Equipment : Hot Air Oven  
Condition As-Received : Used Item  
Reference : 2403-0563OC-1

Cert. No.: 24TM632  
Page : 2 of 3

#### Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD) and Thermocouple Type T.

The temperature scale used was based on ITS-90.

#### Condition of this result of calibration

##### 1. Reference standard instrument:-

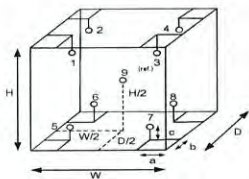
- | Instrument          | Serial No. | Cert. No. | Traceable | Due Date    |
|---------------------|------------|-----------|-----------|-------------|
| 1) Data Acquisition | MY57013711 | 23LM115   | TPA       | 11 Jul 2024 |
2. This certificate is valid only to the item calibrated on date and place of calibration.  
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (\*) Without Adjustment

Function of UUC\* : Temperature Source

Fresh air setting : Close



Probe Installation Details : Dimension of Chamber :  
a = 5.0 cm D = 0.40 m  
b = 5.0 cm W = 0.56 m  
c = 5.0 cm H = 0.48 m  
Capacity = 0.11 m<sup>3</sup>

Environment during calibration		
	Beginning	Finished
Temp. (°C)	27	27
REL.Humid. (%)	57	59
AC Supply ( Volt )	222	224

Ref. Std. ID No.: @ Calibration Point		
Position :	( 180 ) °C	( 104 ) °C
1	18-18TC-01	18-18RTD-01
2	18-18TC-02	18-18RTD-02
3	18-18TC-03	18-18RTD-03
4	18-18TC-04	18-18RTD-04
5	18-18TC-05	18-18RTD-05
6	18-18TC-06	23-18RTD-06
7	18-18TC-07	18-18RTD-07
8	18-18TC-08	22-18RTD-08
9 (ref.)	18-18TC-09	18-18RTD-09



Equipment : Hot Air Oven  
Condition As-Received : Used Item  
Reference : 2403-0563OC-1

Cert. No.: 24TM632  
Page : 3 of 3

#### Result of Calibration :-

Function of UUC\* : Temperature Source  
Fresh air setting : Close

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
104.0	104.0	104.0	0.051	0.59	0.62	2
180.0	180.0	180.0	0.15	1.3	1.7	2

Calibration Point (°C)		Measured Temperature (°C)									Uncertainty (± °C)
		1	2	3	4	5	6	7	8	9 (ref.)	
104.0	103.921	103.786	103.757	103.759	103.950	103.817	104.213	103.672	103.673	0.42	
180.0	179.614	179.270	179.145	179.599	180.001	180.423	180.293	180.629	179.429	1.1	

Average\* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC\* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k, providing a level of confidence of approximately 95 %.

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## Certificate of Calibration

Cert. No.: 24TM634  
Page : 1 of 3

Thanitak.

Equipment : Hot Air Oven  
Manufacturer : Memmert  
Model : UF 110  
Serial No. : B423.0653  
ID No. : RYG\_EN0213  
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)  
616/10 Moo 5 T. Maenam Khu.  
A. Pluakdaeng,  
Rayong 21140 Thailand  
Location : Oven Room  
Received Order : 21 March 2024  
Calibration Date : 21 - 22 March 2024  
Ambient Temperature : ( 26 ± 10 ) °C  
Relative Humidity : ( 50 ± 30 ) %  
Calibrated by : Man Pattanapongpaiboon  
Approved by :   
( ) Ponthippa Tameyakul  
( ) Unnopphol Harachai  
(x) Suwit Imjai  
Issue Date : 23 March 2024

The Uncertainties are for a confidence probability of approximately 95%

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Equipment : Hot Air Oven  
Condition As-Received : Used Item  
Reference : 2403-0563OC-3

Cert. No.: 24TM634  
Page : 2 of 3

#### Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD) and Thermocouple Type T.

The temperature scale used was based on ITS-90.

#### Condition of this result of calibration

##### 1. Reference standard instrument:-

- | Instrument          | Serial No. | Cert. No. | Traceable | Due Date    |
|---------------------|------------|-----------|-----------|-------------|
| 1) Data Acquisition | MY57013711 | 23LM115   | TPA       | 11 Jul 2024 |
2. This certificate is valid only to the item calibrated on date and place of calibration.  
3. This certification is traceable to the International System of Unit.

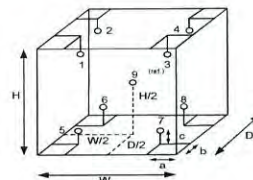
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (\*) Without Adjustment

Function of UUC\* : Temperature Source

Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	27	27
REL.Humid. (%)	59	59
AC Supply ( Volt )	224	223



Probe Installation Details : Dimension of Chamber :  
a = 5.0 cm D = 0.40 m  
b = 5.0 cm W = 0.56 m  
c = 5.0 cm H = 0.48 m  
Capacity = 0.11 m<sup>3</sup>

Ref. Std. ID No.: @ Calibration Point		
Position :	( 180 ) °C	( 104 ) °C
1	18-18TC-01	18-18RTD-01
2	18-18TC-02	18-18RTD-02
3	18-18TC-03	18-18RTD-03
4	18-18TC-04	18-18RTD-04
5	18-18TC-05	18-18RTD-05
6	18-18TC-06	23-18RTD-06
7	18-18TC-07	18-18RTD-07
8	18-18TC-08	22-18RTD-08
9 (ref.)	18-18TC-09	18-18RTD-09





Equipment : Hot Air Oven  
Condition As-Received : Used Item  
Reference : 2403-0563OC-3  
Result of Calibration : ( \* ) Without Adjustment  
Function of UUC\* : Temperature Source  
Fresh air setting : Close

Cert. No.: 24TM634  
Page : 3 of 3

Calibration Point ( °C )	UUC* Setting ( °C )	UUC* Reading ( °C )	Temperature stability ( ± °C )	Temperature uniformity ( °C )	Overall Variation ( °C )	Coverage Factor k
104.0	104.0	104.0	0.065	0.52	0.90	2
180.0	180.0	180.0	0.20	1.2	2.0	2

Calibration Point ( °C )	Measured Temperature ( °C )									Uncertainty ( ± °C )
	1	2	3	4	5	6	7	8	9 (ref.)	
104.0	104.169	103.506	103.898	103.712	103.772	103.730	104.289	103.805	103.798	0.42
180.0	180.701	179.239	179.935	179.999	180.127	180.138	180.895	179.313	180.211	1.1

Average\* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC\* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k*, providing a level of confidence of approximately 95 %.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250  
TEL.0-2717-3000-29 FAX.0-2719-9484



## Certificate of Calibration

Cert. No.: 24TM635  
Page : 1 of 3

Equipment : Water Bath

Manufacturer : Memmert

Model : WNB22

Serial No. : L513.0648

ID No. : RYG\_EN0061

Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)  
616/10 Moo 5, T. Maenam Khu,  
A. Pluakdaeng,  
Rayong 21140, Thailand

Location : Wet Chemistry Lab

Received Order : 21 March 2024

Calibration Date : 21 March 2024

Ambient Temperature : ( 26 ± 10 ) °C

Relative Humidity : ( 50 ± 30 ) %

Calibrated by : Man Pattanapongpaiboon

Approved by :

( ) Pornthippa Tameyakul  
( ) Unnophol Harachai  
(✓) Suwit Imjai

Issue Date : 23 March 2024

The Uncertainties are for a confidence probability of approximately 95%

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Equipment : Water Bath  
Condition As-Received : Used Item  
Reference : 2403-0563OC-4  
Procedure Used :-

Cert. No.: 24TM635  
Page : 2 of 3

Calibration were conducted using in-house calibration procedure CP-OT04 Based on ASTM E715 according to direct measurement method with Data Acquisition which connected with Industrial Platinum Resistance Thermometer ( IPRT ).

The temperature scale used was based on ITS-90.

### Condition of this result of calibration

1. Reference standard instrument-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1 ) Data Acquisition	MY57013711	23LM115	TPA	11 Jul 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.

3. This certification is traceable to the International System of Unit.

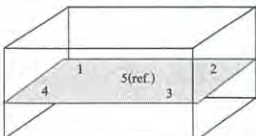
Remark : TPA : Technology Promotion Association ( Thailand - Japan )

Result of Calibration :- ( \* ) Without Adjustment

Function of UUC\* : Temperature Source

Heat transfer medium used : Water

	Environmental		AC Voltage Supply
	( °C )	( %R.H. )	( Volt )
Beginning of Calibration	25	55	222
Finished of Calibration	25	57	223



Front.

Position :	Ref. Std. ID No.:
1	4803988-001
2	4803988-002
3	4803988-003
4	4803988-004
5 (ref.)	4803988-005



Equipment : Water Bath  
Condition As-Received : Used Item  
Reference : 2403-0563OC-4  
Result of Calibration :- ( \* ) Without Adjustment  
Function of UUC\* : Temperature Source

Cert. No.: 24TM635  
Page : 3 of 3

Calibration point ( °C )	UUC* Setting ( °C )	UUC* Reading ( °C )	Average* Standard Reading ( °C )					Uncertainty ( ± °C )
			1	2	3	4	5 (ref.)	
85.0	85.0	85.0	84.428	84.424	84.489	84.507	84.477	0.18

Calibration point ( °C )	Uniformity ( °C )	Stability ( ± °C )	Coverage Factor k
85.0	0.19	0.11	2

Average\* : The average of 30 values in each position.

Uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.

UUC\* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity.

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k*, providing a level of confidence of approximately 95 %.

-o0o-



## Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T. Banpa, A. Kaengkhoh, Saraburi 18110, Thailand  
Saraburi Tel : +66 3627 3096 Fax : +66 3627 3100  
Bangkok Tel : +668 9205 6851 +669 8247 2360  
Website : www.sci-eco.co.th E-Mail : calibrate@scg.com



## Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T. Banpa, A. Kaengkhoh, Saraburi 18110, Thailand



Certificate No. T230116

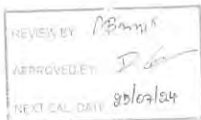
Page 2 of 4

Certificate No. T230116

Page 1 of 4

### Certificate of Calibration

Equipment : Chamber (Cooling Room)  
Manufacturer : MODULAR  
Model : IREVCOHCOO  
Serial No. : C00351459  
Customer Code : RYG\_EN0184  
ID No. : T1939A5  
Customer : ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)  
616/10 Moo 5 T. Maenam Khu,  
A. Plunkdaeng, Rayong 21140  
Customer Location : Laboratory  
Date of Receipt : 23 January 2023  
Calibrated By : Atiphong Rongrat (Technician)  
Approved By : Boonchai Suriyawong (Site Calibration Manager)  
Date of Issue : 07 FEB 2023



The uncertainties are for a confidence probability of approximately 95%.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standard laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Metrological Center.

TABLE 0116 31-08-63

### Calibration Report

Equipment : Chamber (Cooling Room)  
Date of Calibration : 25 January 2023  
Environment : Temperature : 23.4-24.9 °C  
Line Voltage : 221.4-230.2 V  
Relative Humidity : 55 - 65 %RH

#### Condition of this results of calibration :

1. This equipment was calibrated by insert 16 standard thermocouples type T into its chamber, the other one standard thermocouples type T use for ambient temperature measurement. The calibration was done in according to W1-T20 (based on ASTM E145-94 (Reapproved 2001) and AS2853-1986).

All data show below were final values and the initial data from customer request. The temperature scale used was based on ITS - 90.

#### 2. Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No.	Due Date
TC	TYPE T	TN141-TN150	T222123	5 October 2023
TC	TYPE T	TN151-TN160	T222123	5 October 2023
DATA LOGGER	34970A	T150	T222123	5 October 2023

#### 3. This certificate is traceable to :

National Institute of Metrology (Thailand) through Metrological Center (NSC-TISI-TIS 17025 CALIBRATION 0244).

#### 4. Condition of calibrated item : good

##### Equipment Description :

Time Constant : 1 Hour  
Fresh Air Damper : ☐ Open ☐ Min ☐ Medium ☐ Max  
☐ Close  
☒ Not Available

#### 5. Adjustment

( X ) without adjustment ( ) after adjustment

Approved By: Boonchai Suriyawong

TABLE 0116 15-05-63



## Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T. Banpa, A. Kaengkhoh, Saraburi 18110, Thailand



## Metrological Center

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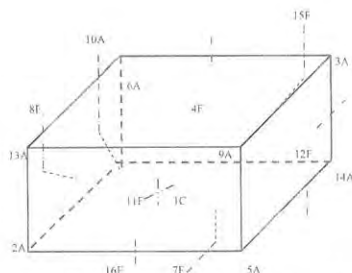
Certificate No. T230116

Page 4 of 4

Certificate No. T230116

Page 3 of 4

### Calibration Report



C = Centre, F = Centre of Face, A = Corner, E = Centre of Edge

1C = TN141	12F = TN152
2A = TN142	13A = TN153
3A = TN143	14A = TN154
4F = TN144	15F = TN155
5A = TN145	16E = TN156
6A = TN146	
7E = TN147	
8F = TN148	
9A = TN149	
10A = TN150	
11F = TN151	

Approved By: Boonchai Suriyawong

TABLE 0116 31-08-63

### Calibration Report

#### Measurement Results

Calibration Point	Average Standard Reading at each position (°C)															
	TN141	TN142	TN143	TN144	TN145	TN146	TN147	TN148	TN149	TN150	TN151	TN152	TN153	TN154	TN155	TN156
3.0	3.03	3.16	3.15	3.19	3.45	3.47	3.21	3.35	3.54	3.45	3.24	3.34	3.28	3.22	3.28	3.21

Chamber (Cooling Room)			Temperature Distribution			
Setting (°C)	Reading (°C)		Stability (°C)	Uniformity (°C)	Uncertainty (±°C)	Coverage Factor k
	Min	Max				
3.0	2.8	4.1	3.5	1.20	1.20	1.90

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which for a t-distribution, providing a level of confidence of approximately 95%.

Approved By: Boonchai Suriyawong

TABLE 0116 15-05-63



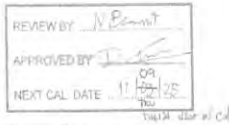
# Certificate of Calibration

Represent to Certificate of Calibration No. C29240007

Equipment: Block Digestion Unit Certificate No.: C29240011  
 Model: KT-206 Issued Date: 22 March 2024  
 Serial No. (or ID.): 5720210009/5770200073 Job No.: WO-00020429  
 Manufacturer: Gerhardt Page: 1 of 4  
 Condition: In Condition Digestion Block: 20 holes

Customer: ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)  
 616/10 Moo 5 T Maenam Khu. A Pluakdaeng, Rayong 21140, Thailand

Environment Condition: Temperature: 25 °C ± 0.7 °C  
 Humidity: 54 %RH ± 4.1 %RH  
 Voltage: 225 VAC ± 1.7 VAC



Calibration Place: ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)  
 (Wet Chemistry Lab)  
 616/10 Moo 5 T Maenam Khu. A Pluakdaeng, Rayong 21140, Thailand.

Calibration By: Mr. Thanathorn Phunook  
 Calibration Date: 11 March 2024  
 The Method used: In house method, base on by comparison with standard  
 Traceability: This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through N.M. Technical Center Laboratory (NTL) Certificate No. TC22/0080

*(Signature)*  
 (Mr. Thanathorn Phunook)  
 Person in charge

*(Signature)*  
 (Mr. Udon Srichana)  
 Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standards or other recognized national standards laboratory.  
 The measurement uncertainty stated in the expanded uncertainty sheet, is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).  
 These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

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 Phone: +66 2639 7000 Email: info@calibration@dksh.com Website: www.dksh.com/calibration-thailand

Delivering Growth - in Asia and Beyond

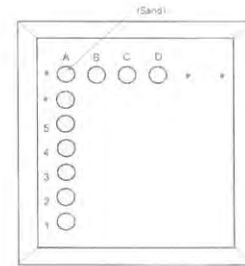
CAL-FM-C29-07 20 Jul 2022

Certificate No. C29240011

Page 2 of 4



Fig. 1 Front view



Location of standard

Fig. 2 Digestion block

## Definitions

**Indicating Temperature:** The average reading of indicating device which forms the integral part of the Digestion block

**Measured Temperature:** The average reading of working standard at any positions or location

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Page 3 of 4

## Calibration Results:

### Pre Calibration

Locations	Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature (°C)	Correction of UUC (°C)	Uncertainty (± °C)
A1	380	N/A	380	401.5	21.5	1.5
A2				401.2	21.2	1.5
A3				399.1	19.1	1.5
A4				397.8	17.8	1.5
A5				395.1	15.1	1.5
B1				396.6	16.6	1.5
B2				396.1	16.1	1.5
B3				392.9	12.9	1.5
B4				391.6	11.6	1.5
B5				390.7	10.7	1.5
C1				395.3	15.3	1.5
C2				395.6	15.6	1.5
C3				392.8	12.8	1.5
C4				391.7	11.7	1.5
C5				390.3	10.3	1.5
D1				397.6	17.6	1.5
D2				396.6	16.6	1.5
D3				395.0	15.0	1.5
D4				394.2	14.2	1.5
D5				393.6	13.6	1.5

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Certificate No. C29240011

Page 4 of 4

## Calibration Results:

### Without adjustment

Locations	Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature (°C)	Correction of UUC (°C)	Uncertainty (± °C)
A1	380	385	385	382.5	17.5	1.5
A2				382.4	17.4	1.5
A3				382.1	17.1	1.5
A4				379.7	14.7	1.5
A5				378.3	13.3	1.5
B1				380.1	15.1	1.5
B2				380.1	15.1	1.5
B3				378.5	13.5	1.5
B4				378.3	13.3	1.5
B5				379.1	14.1	1.5
C1				380.1	15.1	1.5
C2				380.1	15.1	1.5
C3				378.9	13.9	1.5
C4				378.2	13.2	1.5
C5				377.3	12.3	1.5
D1				380.5	15.5	1.5
D2				380.6	15.6	1.5
D3				378.1	13.1	1.5
D4				378.7	13.7	1.5
D5				377.7	12.7	1.5

The End of Certificate

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CAL-FM-C29-07 20 Jul 2022

ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน WO-00020429

ชนิดเครื่องมือ Block Digestion Unit

รุ่น KT-20s

หมายเลขเครื่อง 5720210009/5770200073

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
11 Mar 2024			11 Mar 2024		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	สายไฟ	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	การทำงานของ Main Switch	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	การทำงานของ Selector Key	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4	การแสดงผล Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5	สภาพ Hole	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6	สภาพฝาปิด	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7	สภาพตัวเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8	สภาวะแวดล้อม ณ สถานที่ตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>

ชื่อและนามสกุล

Mr. Thanethorn Phunook  
Service Engineer

บริษัท เทคโนโลยีการบริการ จำกัด (มหาชน)  
2512 หมู่ 5 ตำบลบางนา อำเภอบางนา จังหวัดชลบุรี 20150  
Phone : 08-2119-7500 E-mail : info@technology-thailand.com Website : www.technology-thailand.com

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES  
434-4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250  
TEL: 0-2717-8000-29 FAX: 0-2719-9484



Cert.No.: 23CH1540  
Page.: 1 of 2

Certificate of Calibration

Equipment : pH Meter  
Manufacturer : Mettler Toledo  
Model : Seven2Go S2  
Serial No. : C232588422  
ID No. : RYG\_FS0607  
Condition As-Received : Used Item  
Received Date : 04 December 2023  
Calibration Date : 06 December 2023  
Reference : 2312-0070DSC-1  
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. Rayong Branch  
616/10 Moo 5, T.Maenam Khu, A.Plusdaeng, Rayong 21140, Thailand  
Ambient Temperature : (25 ± 2.5) °C  
Relative Humidity : (50 ± 15) %  
Calibration Procedure : In - house method :  
- CP-CH5 by direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM)  
Calibrated by : Warakorn Lerngratrakul  
Approved by :   
(✓) Sathip Meangmai  
( ) Warakorn Lerngratrakul  
( ) Ponpan Paipim  
Issue Date : 8 December 2023

The Uncertainties are for a confidence probability of approximately 95%

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A 0061470



Cert. No.: 23CH1540  
Page.: 2 of 2

Condition of this calibration result

- Reference Standard Instrument :  
Instrument : Document Process Calibrator  
Serial No. : 54030049  
ID No. : 130RC116  
Cert. No. : Z3E2802  
Due Date : 27 Aug 2024  
This certification is traceable to the international System of Unit maintained through :  
- Technology Promotion Association (Thailand-Japan)

- Certified Reference Materials : The measurement results are traceable to SI through CPA chem Ltd., ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	913598	14 July 2025
pH 6.985	CPA chem	913599	14 July 2024
pH 9.997	CPA chem	940106	02 Nov 2024

- This certificate is valid only to the item calibrated on date and place of calibration.

Calibration Results

Function : mV Measurement

Performing standard curve by Fluke at pH (4,7,10)

Unit Under Calibration	Nominal Value		Standard Voltage Input		Actual Reading		Uncertainty of Measurement (±mV)	Coverage factor k
	pH	mV	mV	pH	mV	pH		
pH Meter S/N : C232588422	4.00	177.48	178	4.00	0.58	2.00	0.58	2.00
	7.00	0.00	0	7.00	0.58	2.00		
	10.00	-177.48	-177	10.00	0.58	2.00		

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4,7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH measurement (±)	Coverage factor k
pH Electrode S/N : 2465870	4.008	4.01	178	0.0071	2.00
	6.985	6.99	2	0.0099	2.00
	9.997	10.00	-173	0.0095	2.00

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k, providing a level of confidence of approximately 95 %

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CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES  
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TEL: 0-2717-8000-29 FAX: 0-2719-9484



Cert. No.: 23LM197  
Page.: 1 of 2

Certificate of Calibration

Equipment : pH Meter with Sensor  
Manufacturer : Mettler Toledo  
Model : Seven2Go S2  
Serial No. : C232588422  
ID No. : RYG\_FS0607  
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.  
Rayong Branch  
616/10 Moo 5 T. Maenam Khu, A. Plusdaeng, Rayong 21140 Thailand  
Location : TPA On Site Calibration Laboratory  
Received Order : 04 December 2023  
Calibrated Date : 08 December 2023  
Ambient Temperature : (26 ± 10) °C  
Relative Humidity : (50 ± 30) %  
AC Line Voltage : (220 ± 22) V  
Calibrated by : Khit Rutanaprapachai  
Approved by :   
( ) Ponthippa Temeyakul  
( ) Ponpan Paipim  
(✓) Suwit Imjai  
Issue Date : 15 December 2023

The Uncertainties are for a confidence probability of approximately 95%

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A 0061579





Equipment : pH Meter with Sensor  
Condition As-Received : Used Item  
Reference : 2312-0070DSC-4

Cert. No.: 23LM197  
Page.: 2 of 2

Procedure Used :-  
Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer ( IPRT ) into Temperature Bath.  
The temperature scale used was based on ITS-90.

#### Condition of this result of calibration

##### 1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Digital Thermometer	A7B843	23124	TPA	04 Jan 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.

3. This certificate is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association ( Thailand - Japan )

Result of Calibration :- ( \* ) Without Adjustment

Function : Temperature measurement

This instrument was connected with temperature sensor, S/N.: 2465870

Calibration Point ( °C )	Immersion Depth ( mm )	Standard Temperature ( °C )	UUC* Reading ( °C )	Error ( °C )	Uncertainty ( ± °C )	Coverage Factor k
25.0	100	25.003	25.2	0.197	0.16	2.00
30.0	100	30.004	30.2	0.196	0.16	2.00
40.0	100	40.003	40.2	0.197	0.16	2.00
50.0	100	50.005	50.2	0.195	0.16	2.00

UUC\* : Unit Under Calibration

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k, providing a level of confidence of approximately 95 %.

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1193732



## Certificate of Calibration

Equipment: SPECTROPHOTOMETER  
Model: DR8000  
Serial No. (or ID.): 1627845 (RYG\_EN0037)  
Manufacturer: HACH  
Condition: In Condition

Certificate No.: C06230441  
Issued Date: 19 September 2023  
Job No.: WO-00005382  
Page: 1 of 3

Customer: ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)  
616/10 Moo 5 T.Maenam Khu,  
A.Pluakdaeng, Rayong 21140, Thailand.

Environment Condition: Temperature 23.9 °C ± 0.2  
Humidity 65.3 %RH ± 1.4

Calibration Place: ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch) (Wet Chemistry)  
616/10 Moo 5 T.Maenam Khu,  
A.Pluakdaeng, Rayong 21140, Thailand.

Calibration By: Mr.Nattapat Rungrueng

Calibration Date: 18 September 2023

The Method used: In house method, CAL-WI-24, base on ASTM E 275-08 and ASTM E 367-04

Traceability: This certificate is traceable to the CRM maintained by National Institute of Standards and Technology (NIST) through Starna Scientific Limited.

The standard for Wavelength Certificate No. 111583 and 111584  
The standard for Photometric Certificate No. 9114984 and 111588  
The standard for Stray light Certificate No. 111586 and 111585  
The standard for Spectral resolution Certificate No. 111587

(Mr. Nattapat Rungrueng)

Person in charge

(Mr. Nitnun Srihawan)

Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated in this expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

DKSH Technology Limited  
2533 Sukhumvit Road, Bangkok, Prachinburi, Bangkok 10260  
Phone: +66 2639 7000 Email: info@dksh.com Website: www.dksh.com/thailand-thailand

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CAL-FM-C06-15: 12 Sep 2022



Certificate No.: C06230441 Page 2 of 3

#### Calibration Results:

##### Without Adjustment

Wavelength Accuracy (nm). The spectral bandwidth of Std at 2 nm and UUC at 2 nm

Standard Wavelength	Unit Under Calibration	Correction	Uncertainty
418.81	418.3	0.31	0.13
536.66	536.6	0.06	0.13
637.98	638.3	-0.32	0.13
748.46	748.7	-0.22	0.13
807.03	807.4	-0.37	0.13

#### Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
420 nm	0.0000	0.000	0.0000	0.0045
	0.2930	0.289	0.0040	0.0045
	0.5166	0.519	-0.0022	0.0045
	1.0298	1.029	0.0008	0.0045
440 nm	0.0000	0.000	0.0000	0.0045
	0.2887	0.283	0.0057	0.0045
	0.5073	0.509	-0.0017	0.0045
	1.0083	1.007	0.0013	0.0045
465 nm	0.0000	0.000	0.0000	0.0045
	0.2516	0.250	0.0016	0.0045
	0.4595	0.462	-0.0025	0.0045
	0.9334	0.933	0.0004	0.0045
546.1 nm	0.0000	0.000	0.0000	0.0045
	0.2461	0.245	0.0011	0.0045
	0.4652	0.466	-0.0008	0.0045
	0.9488	0.946	0.0028	0.0045
560 nm	0.0000	0.000	0.0000	0.0045
	0.2594	0.259	0.0004	0.0045
	0.5040	0.505	-0.0010	0.0045
	1.0032	1.002	0.0012	0.0045
635 nm	0.0000	0.000	0.0000	0.0045
	0.2579	0.257	0.0009	0.0045
	0.4971	0.497	0.0001	0.0045
	0.9720	0.971	0.0010	0.0045

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CAL-FM-C06-15: 12 Sep 2022



Certificate No.: C06230441 Page 3 of 3

#### Calibration Results:

##### Without Adjustment

#### Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
235 nm	0.0000	0.000	0.0000	0.0080
	0.7355	0.737	-0.0015	0.0080
257 nm	0.0000	0.000	0.0000	0.0080
	0.8574	0.857	0.0004	0.0080
313 nm	0.0000	0.000	0.0000	0.0080
	0.2864	0.290	-0.0036	0.0080
350 nm	0.0000	0.000	0.0000	0.0080
	0.8374	0.837	0.0004	0.0080

Stray light *	Standard: cut-off	UUC: Wavelength (nm)	UUC: Transmission (%)	Absorbance (A)
260.62 ± 0.11 nm		260.6	1.3	1.886
391.44 ± 0.11 nm		391.4	1.3	1.886

Spectral Resolution *	Peak	Trough	Ratio	SBW
Nominal Concentration 0.02 % v/v				
Standard Wavelength ( nm )	268.66	266.66	1.38	2.00
UUC: Wavelength ( nm )	268.2	266.1		
Std Absorbance ( A )	0.4566	0.2760		
Absorbance ( A )	0.413	0.300		

\* Calibration Marked " Not TISI Accredited " in this Certificate have been included for completeness.

The End of Certificate

DKSH Technology Limited  
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CAL-FM-C06-15: 12 Sep 2022



## ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

เลขที่ใบงาน: WO-00005392

ชนิดเครื่องมือ: SPECTROPHOTOMETER รุ่น: DR6000

หมายเลขเครื่อง: 1627845

ตรวจสอบ (วัน)		รายการตรวจเช็ค	ตรวจสอบ (ตั้ง)		หมายเหตุ
16 Sep 2023			18 Sep 2023		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. ความสมบูรณ์เครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสะอาด ( ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. สวิตช์ ปิด – เปิด เครื่อง (On-Off Switch)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. ปุ่มกด (Keypad)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. หน้าจอ (Display, Screen Contrast)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		Spectrophotometer			
<input type="checkbox"/>	<input type="checkbox"/>	6. แรงดันไฟฟ้า (Battery Backup) >= 2.5 VDC	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	7. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. ความยาวคลื่น (Wavelength Check)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. แหล่งกำเนิดแสง (UV < 3,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	9.2 Hours
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. แหล่งกำเนิดแสง (Visible < 5,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	741.5 Hours
<input checked="" type="checkbox"/>	<input type="checkbox"/>	11. ช่องวัดหลายตัวอย่าง (Carousel Module)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		pH Meter and Conductivity Meter			
<input type="checkbox"/>	<input type="checkbox"/>	12. อิเล็กโทรด ( Electrode and Connection Cable )	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	13. ระดับสารละลายใน Electrode (Level KCl )	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	14. ฝาปิดกันปลาย Electrode (Dust Protection Hood)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	15. ขาจับอิเล็กโทรด (Stand)	<input type="checkbox"/>	<input type="checkbox"/>	
		Turbidimeter			
<input type="checkbox"/>	<input type="checkbox"/>	16. ค่าความขุ่นที่ใส่สุญ (No Sample)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	17. ระดับการส่องสว่างของแสง (>= 2.5 ไม่นเกิน 3.0)	<input type="checkbox"/>	<input type="checkbox"/>	
		Automatic titrator			
<input type="checkbox"/>	<input type="checkbox"/>	18. ฟิล์ม Piston Burettes	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	19. Function Rinsing and Dosing	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	20. ระบบท่อสายยางและอุปกรณ์ประกอบ	<input type="checkbox"/>	<input type="checkbox"/>	

เพิ่มเซ็นเซอร์แนบมา: \*656.1nm=656.1nm

\*486.0nm=485.5nm

Mr.Nattapat Rungueang  
Service Engineer

Agilent Technologies จำกัด (มหาชน)  
2525 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10110  
2525 Sukhumvit Road, Bangkok, Thailand, Bangkok 10110  
Phone: +66 2029 7000 Email: info.asia@agilent.com Website: www.agilent.com/thailand

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CAL-FM-R31-03: 20 Jul 2022

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## Certificate of System Qualification

GC-OQ + GCMS-OQ

REVIEW BY	<i>Nat Sor</i>
APPROVED BY	<i>LLA</i>
NEXT CAL DATE	13-Jun-25

Agilent CrossLab Compliance Services

System ID: GM-7  
Organization Name: ALS Laboratory Group (Thailand) Co., Ltd.  
Organization Location: 104 Pathanakarn 40, Pathanakarn Rd., Khwang Suan Luang, Khel Suan Luang, Bangkok.

Date: December 13, 2023 3:32:46 PM  
EQP Name: AgilentRecommended, AgilentRecommended  
EQP Revision: GC.02.50, GCMS.02.50  
Overall Qualification Status: Pass

### System Inspection and Basic Safety and Operation

Name: 7890  
Setpoint Status: Pass

Overall System Inspection and Basic Safety and Operation Test Status  
Pass

### Inlet Pressure Accuracy

Name: 7890  
Front SSL  
Setpoint Status: Pass  
Setpoint: 25.0 psi Actual: 25.0 psi  
Inlet Pressure: 25.0 psi  
Accuracy: 0.0 psi  
Agilent Recommended:  $\leq 1.2$

Overall Inlet Pressure Accuracy Test Status  
Pass

### GC Oven Temperature Accuracy

Name: 7890

Date: December 13, 2023 3:32:46 PM  
System ID: GM-7

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Agilent CrossLab Compliance Services

Setpoint Status: Pass  
Zone: Oven  
Setpoint/Actual  
Temperature: 230.0 232.3 °C  
Accuracy: 2.3 °C  
Agilent Recommended:  $\geq -1.0$  % setpoint in K ( -5.0 °C )  
 $\leq 1.0$  % setpoint in K ( 5.0 °C )

Setpoint Status: Pass  
Zone: Oven  
Setpoint/Actual  
Temperature: 100.0 100.7 °C  
Accuracy: 0.7 °C  
Agilent Recommended:  $\geq -1.0$  % setpoint in K ( -3.7 °C )  
 $\leq 1.0$  % setpoint in K ( 3.7 °C )

Overall GC Oven Temperature Accuracy Test Status  
Pass

### GC Oven Temperature Stability

Name: 7890  
Setpoint Status: Pass  
Setpoint/Average  
Temperature: 100.0 100.4 °C  
Stability: 0.0 °C  
Agilent Recommended:  $\leq 0.5$

Overall GC Oven Temperature Stability Test Status  
Pass

### Log Amp

Tested Combination1 Front SSL / External SQ  
Name: 5977A  
Setpoint Status: Pass

Date: December 13, 2023 3:32:46 PM  
System ID: GM-7

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Agilent CrossLab Compliance Services

Overall Log Amp Test Status  
Pass

### RFPA

Tested Combination1 Front SSL / External SQ  
Name: 5977A  
Setpoint Status: Pass  
Amu: 1050 m/z Drift After Five Minutes: 2 mV RFPA Voltage: 504 mV  
Agilent Recommended:  $\geq -100$  and  $\leq 100$   $\leq 1100$

Overall RFPA Test Status  
Pass

### Tune EI

Tested Combination1 Front SSL / External SQ  
Name: 5977A

Setpoint Status: Pass  
Filament: 1

Setpoint Status: Pass  
Filament: 2

Overall Tune EI Test Status  
Pass

### Signal to Noise EI

Tested Combination1 Front SSL / External SQ  
Name: 5977A

Date: December 13, 2023 3:32:46 PM  
System ID: GM-7

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Source: EI - Extractor Filament: 1  
Setpoint Status: Pass  
Signal to Noise: 11316  
Agilent Recommended: >= 1200

Source: EI - Extractor Filament: 2  
Setpoint Status: Pass  
Signal to Noise: 16588  
Agilent Recommended: >= 1200

Overall Signal to Noise EI Test Status  
Pass

NOTE: This test's 0 comment(s) and 0 deviation(s) are available in the Attachments section.

Instrument Details

Purpose  
This section describes the as found system configuration

Details

System  
System ID GM-7  
Manufacturer Agilent Technologies  
Name 7890  
Tested Combination 1  
Injection Technique Manual Injection  
Inlet Front  
Detector External  
LTM Included? No  
Sampler 1  
Manufacturer Agilent Technologies  
Type Manual Injection  
Usage Sample Injection  
Syringe Volume (µL) 10  
Mainframe 1  
Manufacturer Agilent Technologies  
Name 7890  
Model Number G3442B  
Serial Number CN141331B1  
Firmware Revision B.02.03  
Oven Type Standard

Inlet 1  
Manufacturer Agilent Technologies  
Name 7890  
Type SSL  
Location Front  
Carrier Gas Helium  
Control Type Electronic Pressure Control (EPC)  
Purged Inlet Yes

Detector 1  
Manufacturer Agilent Technologies  
Name Mass Spectrometer  
Type Mass Spectrometer  
Location External

Mass Spectrometer 1  
Manufacturer Agilent Technologies  
Type SQ  
Name 5877A  
Serial Number US1415M209  
Firmware Revision 5877 B.00.21  
High Vacuum System Turbo Pump  
Scouting Run Standard OFN Std

MS EI Source 1  
Manufacturer Agilent Technologies  
Source Type EI - Extractor  
Number of filaments 2

Electronic Signature

Purpose  
This signature page was created and published because the ACE sign-off action was executed, which is valid for the entire document, including attachments. The ACE sign-off is an electronic signature that requires two distinct identification components: unique username and personal password. The Agilent representative who has delivered this service understands the meaning and legal status of an electronic signature. As a trained official operator, the Agilent representative has a unique password and login to access ACE and electronically sign this document. (Other e-signatures can be applied to this document using a Document Content Management or other suitable method defined in your data access and control procedures.)

Details

Full Name of Signer Supasak Nimsongtham  
Logged On User Name supasak.nimsongtham@agilent.com  
Signature Creation Date December 13, 2023  
Reason for Signature Executed protocol and published this original version of document

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User Name: supasak.nimsongtham  
Report Generated by Hostname: ASBKKW2492

System ID: GM-7  
Print Date: December 13, 2023 3:32:47 PM

## GM-7-2023 Transaction log

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 13, 2023 10:22:24 AM	Audit	SessionCreated	Session	None
December 13, 2023 10:22:24 AM	Start	Configuration	Session	None
December 13, 2023 10:22:24 AM	Audit	Entitlement	Licensing	User is Field Engineer and does not require an unlock code
December 13, 2023 10:23:53 AM	Audit	EqLoaded	Session	EOP details for primary technique [GC] - File path: [ProtocolPacks/GC/Configurations/02.50/GC/02.50.eop], EOP File Name: [GC/02.50.eop], EOP Name: [AgilentRecommended], Protocol Revision: [GC/02.50], EOP details for hyphenated technique [GCMS] - File path: [ProtocolPacks/GC/Configurations/02.50/GC/02.50.eop], EOP File Name: [GCMS/02.50.eop], EOP Name: [AgilentRecommended]
December 13, 2023 10:23:56 AM	End	Configuration	Session	None
December 13, 2023 10:23:58 AM	Start	Qualification	Session	OQ
December 13, 2023 10:27:59 AM	Start	Execution	System Inspection and Basic Safety and Operation - 7890 - Qualitative Test - No setpoints associated	None

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Date: December 13, 2023 3:32:46 PM  
System ID: GM-7

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User Name: supasak.nimsongtham  
Report Generated by Hostname: ASBKKW2492

System ID: GM-7  
Print Date: December 13, 2023 3:32:47 PM

## GM-7-2023 Transaction log

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 13, 2023 10:24:10 AM	End	Execution	System Inspection and Basic Safety and Operation - 7890 - Qualitative Test - No setpoints associated	Run Count: 1
December 13, 2023 10:24:11 AM	Start	Execution	Inlet Pressure Accuracy - Front SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
December 13, 2023 10:24:15 AM	End	Execution	Inlet Pressure Accuracy - Front SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count: 1
December 13, 2023 10:24:17 AM	Start	Execution	GC Oven Temperature Accuracy - 7890 - Temperature - Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
December 13, 2023 10:32:09 AM	Audit	Data	GC Oven Temperature Accuracy - 7890 - Temperature - Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
December 13, 2023 10:32:11 AM	End	Execution	GC Oven Temperature Accuracy - 7890 - Temperature - Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count: 1
December 13, 2023 10:32:12 AM	Start	Execution	GC Oven Temperature Accuracy - 7890 - Temperature - Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
December 13, 2023 10:34:58 AM	Audit	Data	GC Oven Temperature Accuracy - 7890 - Temperature - Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
December 13, 2023 10:34:59 AM	End	Execution	GC Oven Temperature Accuracy - 7890 - Temperature - Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count: 1

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Date: December 13, 2023 3:32:46 PM  
System ID: GM-7

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User Name: supasak.nimsongtham  
Report Generated by Hostname: ASBKKW2492

System ID: GM-7  
Print Date: December 13, 2023 3:32:47 PM

## GM-7-2023 Transaction log

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 13, 2023 10:35:00 AM	Start	Execution	GC Oven Temperature Stability - 7890 - Temperature - Oven - S: 100.0°C - L: <= 0.5°C	None
December 13, 2023 10:35:27 AM	Start	Execution	Signal to Noise EI - Liquid Injection, Front SSL, SQ - Source: EI - Extractor using Filament 1 - L: >= 1200	None
December 13, 2023 10:36:39 AM	Start	Execution	GC Oven Temperature Stability - 7890 - Temperature - Oven - S: 100.0°C - L: <= 0.5°C	None
December 13, 2023 10:56:10 AM	Audit	Data	GC Oven Temperature Stability - 7890 - Temperature - Oven - S: 100.0°C - L: <= 0.5°C	Manual Data Entry
December 13, 2023 10:55:12 AM	End	Execution	GC Oven Temperature Stability - 7890 - Temperature - Oven - S: 100.0°C - L: <= 0.5°C	Run Count: 1
December 13, 2023 10:55:13 AM	Start	Execution	Log Amp - 5977A SQ - Source: EI - Extractor	None
December 13, 2023 10:56:42 AM	End	Execution	Log Amp - 5977A SQ - Source: EI - Extractor	Run Count: 1
December 13, 2023 10:56:42 AM	Start	Execution	RPFA - 5977A SQ - Source: EI - Extractor	None
December 13, 2023 11:04:44 AM	End	Execution	RPFA - 5977A SQ - Source: EI - Extractor	Run Count: 1
December 13, 2023 11:04:45 AM	Start	Execution	Tune EI - 5977A SQ - Source: EI - Extractor Filament 1 (Qualitative - No setpoints associated)	None
December 13, 2023 11:32:36 AM	End	Execution	Tune EI - 5977A SQ - Source: EI - Extractor Filament 1 (Qualitative - No setpoints associated)	Run Count: 1

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Date: December 13, 2023 3:32:46 PM  
System ID: GM-7

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User Name: supasak.nimsongtham  
Report Generated by Hostname: ASBKKW2492

System ID: GM-7  
Print Date: December 13, 2023 3:32:47 PM

## GM-7-2023 Transaction log

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 13, 2023 11:32:36 AM	Start	Execution	Tune EI - 5977A SQ - Source: EI - Extractor Filament 2 (Qualitative - No setpoints associated)	None
December 13, 2023 11:32:06 AM	Start	Execution	Signal to Noise EI - Liquid Injection, Front SSL, SQ - Source: EI - Extractor using Filament 1 - L: >= 1200	None
December 13, 2023 11:49:28 AM	Start	Execution	Tune EI - 5977A SQ - Source: EI - Extractor Filament 2 (Qualitative - No setpoints associated)	None
December 13, 2023 11:49:42 AM	End	Execution	Tune EI - 5977A SQ - Source: EI - Extractor Filament 2 (Qualitative - No setpoints associated)	Run Count: 1
December 13, 2023 11:49:43 AM	Start	Execution	Signal to Noise EI - Liquid Injection, Front SSL, SQ - Source: EI - Extractor using Filament 1 - L: >= 1200	None
December 13, 2023 11:49:48 AM	Audit	AcqClosed	Session	None
December 13, 2023 12:36:39 PM	Audit	AcqRestarted	Session	None
December 13, 2023 12:36:40 PM	Audit	SessionReloaded	Session	None
December 13, 2023 12:36:42 PM	Start	Qualification	Session	OQ
December 13, 2023 12:36:42 PM	Start	Execution	Signal to Noise EI - Liquid Injection, Front SSL, SQ - Source: EI - Extractor using Filament 1 - L: >= 1200	None

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Date: December 13, 2023 3:32:46 PM  
System ID: GM-7

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User Name: nupatkal.nimsingtham  
Report Generated by Hostname: ASBKKW0452

System ID: GM-7  
Print Date: December 13, 2023 3:32:47 PM

## GM-7-2023 Transaction log

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 13, 2023 12:37:53 PM	Audit	Date	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L, >= 1200	Data File Path: D:\MassHunter\GCMS\1\data\IQG2023IS2N_F1.D
December 13, 2023 12:38:18 PM	End	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L, >= 1200	Run Count: 1
December 13, 2023 12:39:51 PM	Audit	TestUnlocked	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L, >= 1200	Deviation filed for Run Count: 1
December 13, 2023 12:39:51 PM	Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L, >= 1200	None
December 13, 2023 12:47:15 PM	Audit	Date	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L, >= 1200	Data File Path: D:\MassHunter\GCMS\1\data\IQG2023IS2N_F1.D
December 13, 2023 12:42:00 PM	End	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L, >= 1200	Run Count: 2
December 13, 2023 12:42:08 PM	Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L, >= 1200	None
December 13, 2023 12:42:17 PM	Audit	Date	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L, >= 1200	Data File Path: D:\MassHunter\GCMS\1\data\IQG2023IS2N_F2.D

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Date: December 13, 2023 3:32:46 PM  
System ID: GM-7

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User Name: nupatkal.nimsingtham  
Report Generated by Hostname: ASBKKW0452

System ID: GM-7  
Print Date: December 13, 2023 3:32:47 PM

## GM-7-2023 Transaction log

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 13, 2023 12:43:54 PM	End	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L, >= 1200	Run Count: 1
December 13, 2023 1:54:41 PM	Audit	TestUnlocked	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L, >= 1200	Deviation filed for Run Count: 2
December 13, 2023 1:54:41 PM	Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L, >= 1200	None
December 13, 2023 1:54:50 PM	Audit	Date	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L, >= 1200	Data File Path: D:\MassHunter\GCMS\1\data\IQG2023IS2N_F1.D
December 13, 2023 1:55:22 PM	End	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L, >= 1200	Run Count: 3
December 13, 2023 1:56:50 PM	Audit	TestUnlocked	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L, >= 1200	Deviation filed for Run Count: 3
December 13, 2023 1:56:50 PM	Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L, >= 1200	None
December 13, 2023 2:14:32 PM	Audit	Date	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L, >= 1200	Data File Path: D:\MassHunter\GCMS\1\data\IQG2023IS2N_F1.D

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Date: December 13, 2023 3:32:46 PM  
System ID: GM-7

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User Name: nupatkal.nimsingtham  
Report Generated by Hostname: ASBKKW0452

System ID: GM-7  
Print Date: December 13, 2023 3:32:47 PM

## GM-7-2023 Transaction log

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 13, 2023 2:15:03 PM	End	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L, >= 1200	Run Count: 4
December 13, 2023 2:25:07 PM	Audit	TestUnlocked	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L, >= 1200	Deviation filed for Run Count: 1
December 13, 2023 2:25:07 PM	Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L, >= 1200	None
December 13, 2023 2:25:20 PM	Audit	Date	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L, >= 1200	Data File Path: D:\MassHunter\GCMS\1\data\IQG2023IS2N_F2.D
December 13, 2023 2:25:41 PM	End	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L, >= 1200	Run Count: 2
December 13, 2023 2:26:11 PM	Audit	TestUnlocked	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L, >= 1200	Deviation filed for Run Count: 2
December 13, 2023 2:26:51 PM	Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L, >= 1200	None
December 13, 2023 2:27:01 PM	Audit	Date	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L, >= 1200	Data File Path: D:\MassHunter\GCMS\1\data\IQG2023IS2N_F2.D

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Date: December 13, 2023 3:32:46 PM  
System ID: GM-7

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User Name: nupatkal.nimsingtham  
Report Generated by Hostname: ASBKKW0452

System ID: GM-7  
Print Date: December 13, 2023 3:32:47 PM

## GM-7-2023 Transaction log

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 13, 2023 2:27:42 PM	End	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L, >= 1200	Run Count: 3
December 13, 2023 2:29:14 PM	Audit	TestUnlocked	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L, >= 1200	Deviation filed for Run Count: 3
December 13, 2023 2:29:14 PM	Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L, >= 1200	None
December 13, 2023 2:34:02 PM	Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L, >= 1200	None
December 13, 2023 2:41:29 PM	Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L, >= 1200	None
December 13, 2023 2:42:42 PM	Audit	Date	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L, >= 1200	Data File Path: D:\MassHunter\GCMS\1\data\IQG2023IS2N_F2_001.D
December 13, 2023 2:44:35 PM	End	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L, >= 1200	Run Count: 4
December 13, 2023 2:44:58 PM	End	Qualification	Session	OK
December 13, 2023 2:44:58 PM	Start	Prepaving	Session	None

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Date: December 13, 2023 3:32:46 PM  
System ID: GM-7

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User Name: sapasath.singhthum  
Report Generated by Headline: ASDR0000492  
System ID: GM-7  
Print Date: December 13, 2023 1:52:47 PM

## GM-7-2023 Transaction Log

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 13, 2023 3:01:22 PM	Audit	AccClosed	Session	Note
December 13, 2023 3:26:10 PM	Audit	AccRestarted	Session	Note
December 13, 2023 3:29:10 PM	Audit	SessionReleased	Session	Note
December 13, 2023 3:29:13 PM	Start	Qualification	Session	OQ
December 13, 2023 3:31:33 PM	Audit	Reporting	Session	Report Generated: Certificate
December 13, 2023 3:32:15 PM	Audit	Reporting	Session	Report Generated: Report

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Date: December 13, 2023 3:32:46 PM  
System ID: GM-7

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Lamphun: 122/5 M.4, Ban Klang, Muang, Lamphun [T. 053-581-876]  
Prachinburi: 688 M.10, Thatum, Srimahaphote, Prachinburi [T. 037-309-880]

MTOC: L-1113/2023

Report No.: ALS-799/02

## ASI Maintenance Report

Instrument : Automatic Sample Injector Measuring : Vial 40 mL  
Model : ASI-L Place of Installation : -  
Serial No. : H57415200799 Department : LABORATORY  
Manufacture : Shimadzu

Customer : ALS Laboratory Group (Thailand) Co., Ltd.  
104 Phatthanakan 40, Phatthanakan Rd.,  
Khwaen Suan Luang, Khet Suan Luang,  
Bangkok 10250 Thailand

Date of Maintenance : 10 / 11 / 2023

Ambient Condition : Temperature  $26.0 \pm 5^\circ\text{C}$   
Humidifier  $60 \pm 15\% \text{RH}$

REVIEW BY	<u>Vichula N.</u>
APPROVED BY	<u>Sinluk P.</u>
NEXT CAL DATE	<u>9/11/24</u>

Maintenance By : Peerapong Sangpan  
( Mr. Peerapong Sangpan )  
Technician

Approved By : N. Phungsomsak  
( Mr. Nipon Phungsomsak )  
Technician Manager

User Name : Sinluk P.  
( Mr. )

SHIMADZU ANALYZER  
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Prachinburi: 688 M.10, Thatum, Srimahaphote, Prachinburi [T. 037-309-880]

MTOC: L-1113/2023

Report No.: ALS-799/02

## Maintenance Sheet

Customer : ALS Laboratory Date : 10 / 11 / 2023  
Model : ASI-L Serial No. H57415200799

Item	Carry out maintenance work	Result	Exchange	Comment
1.	Arm Drive section	O.K.		
	Check Arm Drive Belt for wear and tension	O.K.		
	Check grease of Screw Arm Drive	O.K.		
2.	Rinse pump (only ASI-V 24mL, 40mL)	O.K.		
	Check pump rate(>40mL/min)	O.K.		
	Check pump and tube connection for leakage	O.K.		
	Check if outlet flow is in proper condition	O.K.		
3.	Check and if necessary exchange consumable, Maintenance parts	O.K.		See appropriate list of maintenance parts
4.	Check Stirrer (When installed)	O.K.		
5.	Verify ASI function via mechanical check	O.K.		

Inspection by : Peerapong Sangpan  
( Mr. Peerapong Sangpan )  
Technician

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Prachinburi: 688 M.10, Thatum, Srimahaphote, Prachinburi [T. 037-309-880]

MTOC: L-1113/2023

Report No.: ALS-799/02

## List of Consumable, Maintenance parts

Pos.	Part Number	Part Name	Result	Exchange	Recommended Interval
1.	017-27021-01	Grease Paste, Lubricant 100g	O.K.	√	1 time per year
2.	032-22661-02	Belt, 60S2m596, Arm Drive	O.K.		1 time per year
3.	034-03067-02	Spring, F-642, Arm Drive	O.K.		Depending on condition
4.	042-00405-11	Pump Head, for ASI Rinse Pump (only ASI-V 24mL, 40mL)	O.K.		Depending on condition
5.	638-41448-01	Std. Needle Type1 24mL, 40mL* (for tube 2, 1x1, 6), [ Sparge needle]	N/A		Depending on condition
6.	638-41448-02	Std. Needle Type1 125mL* (for tube 2, 1x1, 6)	N/A		Depending on condition
7.	631-41660-03	Flare Pipe 2x1.5x700mm* (for Standard Needle Type1 24mL, 40mL, 125mL)	N/A		Depending on condition (may cut to origin length 600mm)
8.	638-41450-01	Needle for Suspended Particles,* 0.8mm (only ASI-V 24mL, 40mL)	N/A		Depending on condition
9.	638-41450-01	Std. Needle Type2 125mL* (for tube 1, 4x0.9)	N/A		Depending on condition
10.	638-41472-01	Std. Needle Type2 24mL, 40mL* (for tube 1, 4x0.9)	O.K.		Depending on condition
11.	631-41660-02	Flare Pipe 1, 4x0.9x600mm* (for Suspended + Needle Type2)	O.K.		Depending on condition
12.	638-41449-01	Double Needle, only 24mL, 40mL (simultaneous sparge type)*	N/A		Depending on condition
13.	631-41660-01	Flare Pipe 1, 1x0.6x600mm* (for Double Needle 24mL, 40mL)	N/A		Depending on condition

\*Note: needed parts depending on installed needle types!

Inspection by : Peerapong Sangpan  
( Mr. Peerapong Sangpan )  
Technician

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Prachinburi : 688 M.10, Thatum, Srirachaphote, Prachinburi [T. 037-208-880]

MTOC : L-1112/2023

Report No. : ALS-416/02

### TOC-L Maintenance Report

Instrument : Total Organic Carbon Analyzer Measuring : TC O ~ 30000 mg/L  
Model : TOC-LCSH Place of Installation : -  
Serial No. : H54425300416 Department : LABORATORY  
Manufacture : Shimadzu

Customer : ALS Laboratory Group (Thailand) Co., Ltd.  
104 Phatthanakan 40, Phatthanakan Rd.,  
Khwaen Suan Luang, Khet Suan Luang,  
Bangkok 10250 Thailand

Date of Maintenance : 10 / 11 / 2023

Ambient Condition : Temperature 26.0 ± 5 °C

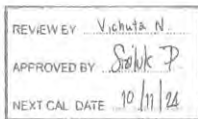
: Humidifier 60 ± 15 %RH

Maintenance By : Peerapong Sangpan  
(Mr. Peerapong Sangpan)  
Technician

Approved By : N. Pong  
(Mr. Nipon Phongsomsak)  
Technician Manager

User Name : Sinluk P.  
( )

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Prachinburi : 688 M.10, Thatum, Srirachaphote, Prachinburi [T. 037-208-880]

MTOC : L-1112/2023

Report No. : ALS-416/02

### Maintenance Sheet

Customer : ALS Laboratory Date : 10 / 11 / 2023  
Model : TOC-LCSH Serial No. H54425300416

Item	Carry out maintenance work	Result	Exchange	Comment
1.	Check functionality of the device			
	Check furnace temperature (Standard cat. 680 °C / for TN cat. 720 °C)	O.K.		
	Check dehumidifier temperature (± 1 °C)	O.K.		
	Check the entire flow line related to leakage	O.K.		
	Check baseline status (OK)	O.K.		
	Check carrier gas pressure (200 ±10 kPa)	O.K.		
	Check carrier gas flow rate (150 mL/min)	O.K.		
2.	Tubes			
	Check all tubing for contamination, if necessary clean them	O.K.		
	Check all tubing for tight connection	O.K.		
3.	Container and Drainage			
	Fill up humidifier with pure water to max. level	O.K.		
	Check filling of dilution water and acid container	O.K.		
	Rinse Drain Pot, after wards refill again with pure water	O.K.		
	Check if outlet flow is in proper conditions	O.K.		
4.	TC and IC Injection			
	Clean injector Block	O.K.		
	Check injector Block for wear	O.K.		
	Check injection tube adjustment	O.K.		
	Check injection for leakage	O.K.		
	Check injection for clogging	O.K.		
5.	IC Measurement (N-type)			
	Check acidification in syringe			
	Check sparging in syringe			
6.	Eye check of 8-Port valve, for sample residues or moist spots that indicate possible leakage	O.K.		
7.	Check and if necessary exchange consumable, Maintenance parts	O.K.		See list of consumable, maintenance parts

Inspection by : Peerapong Sangpan  
(Mr. Peerapong Sangpan)  
Technician

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Prachinburi : 688 M.10, Thatum, Srirachaphote, Prachinburi [T. 037-208-880]

MTOC : L-1112/2023

Report No. : ALS-416/02

Item	Carry out maintenance work	Result	Exchange	Comment
8.	Due to instrument condition, clean the instrument inside and outside.	O.K.		
9.	After checking the system and exchanging of consumable and maintenance parts a new 1-3 point calibration have to be done.	O.K.		Addition test 1.
10.	After wards the calibration perform check sample measurement.	O.K.		Addition test 2.

### Addition test

Test no.	Test conditions	Meas. value	Result
1.	Calibration TC standard solution at 0, 0.1, 0.5, 1, 5, 10, 20 injection volume 50 µL No. of measurement 2 times (Max.3) Criteria : R <sup>2</sup> = 0.995 or more	1.0000	Pass Attachment : ALS-416/02 Page 1/4 - 2/4
2.	Measurement of reagent water and TC standard solution at 5.0 mg/L injection volume 50 µL No. of measurement 2 times (Max.3) and calculate accuracy by Meas. of TC standard - Meas. of Reagent water Criteria : Accuracy %Recovery 10% or less	5.112 - 0.1493 = 4.9627 ppm	Pass Attachment : ALS-416/02 Page 3/4 - 4/4

Inspection by : Peerapong Sangpan  
(Mr. Peerapong Sangpan)  
Technician

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MTOC : L-1112/2023

Report No. : ALS-416/02

### List of Consumable, Maintenance parts

Pos.	Part Number	Part Name	Result	Exchange	Recommended Interval
1.	036-11209-84	O-ring, 4D P10A (Viton, for TC,IC Slider)	O.K.	✓	1 time per year, Depending on condition
2.	036-11219-84	O-ring, 4D P20 (for sealing TC-Combustion tube)	O.K.	✓	1 time per year, Depending on condition
3.	638-15025	O-ring, P1FE (for TC,IC-Slider)	O.K.	✓	1 time per year, Depending on condition
4.	630-00105-01	Platinum net, (2pcs-set) (to support catalyst)	O.K.	✓	6 month same time as catalyst exchange
5.	630-00557	Silica Wool (to support catalyst)	O.K.	✓	6 month same time as catalyst exchange
6.	630-00992	Halogen Scrubber	O.K.	✓	6 month
7.	630-00996	High Sensitivity TC Catalyst (When installed)	N/A		Depending on condition
8.	638-60116	Regular Catalyst (33g) (When installed)	O.K.	✓	6 month
9.	638-56251-01	8-Port valve rotor	O.K.	✓	1 time per year
10.	638-41323	TC-Combustion Tube	O.K.	✓	6 month same time as catalyst exchange
11.	631-43404-01	Packing, gasket slider (for TC-Injection tube)	O.K.		1 time per year, Depending on condition
12.	638-59296	Syringe 5mL	O.K.		Depending on condition
13.	638-59296-01	Plunger Tip (for syringe 5mL)	O.K.	✓	6 month
14.	042-00405-11	IC reagent supply pump head	O.K.		1 time per year
15.	630-00999	CO2-Absorber (for cell space purge)	O.K.	✓	1 time per year
16.	630-00964	Molecular Sieves 13x	O.K.	✓	1 time per year

Note. Table indicates the guidelines replacement periods when NPOC measurement is performed on sample that are comparatively as clean as tap water, use standard catalyst and at a rate of about 500 sample per month (operating five days a week)

Inspector By : Peerapong Sangpan  
(Mr. Peerapong Sangpan)  
Technician

SHIMADZU ANALYZER  
4/4

# TOC-Control L Report

2023-11-10 00:00 PM 2:24

## Inst. Information

Instrument Options  
Catalyst

TOC ASK Unit  
Regular Sensitivity

## Cal. Curve

Sample Name  
Sample ID  
Cal. Curve  
Status

Unlabeled  
Unlabeled  
TC 0.1 - 20 ppm 2023-11-10 12:39:04 cal  
Completed

Conc: 0.000mg/L

Time	Area	Height	Width	Time	Area	Height	Width
0	0.000	0.000	0.000	0	0.000	0.000	0.000
0	0.000	0.000	0.000	0	0.000	0.000	0.000
0	0.000	0.000	0.000	0	0.000	0.000	0.000

Acid Add: 0.000%  
Mean Area: 0.000%  
SD Area: 0.000%  
CV Area: 0.000%



Conc: 0.100mg/L

Time	Area	Height	Width	Time	Area	Height	Width
0	1.200	1.200	1.200	0	1.200	1.200	1.200
0	1.000	1.000	1.000	0	1.000	1.000	1.000
0	1.300	1.300	1.300	0	1.300	1.300	1.300

Acid Add: 0.000%  
Mean Area: 1.000%  
SD Area: 0.000%  
CV Area: 0.000%



Conc: 0.500mg/L

Time	Area	Height	Width	Time	Area	Height	Width
0	1.200	1.200	1.200	0	1.200	1.200	1.200
0	1.400	1.400	1.400	0	1.400	1.400	1.400
0	1.300	1.300	1.300	0	1.300	1.300	1.300

Acid Add: 0.000%  
Mean Area: 1.200%  
SD Area: 0.000%  
CV Area: 0.000%



Conc: 1.000mg/L

Time	Area	Height	Width	Time	Area	Height	Width
0	1.200	1.200	1.200	0	1.200	1.200	1.200
0	1.400	1.400	1.400	0	1.400	1.400	1.400
0	1.300	1.300	1.300	0	1.300	1.300	1.300

Acid Add: 0.000%  
Mean Area: 1.200%  
SD Area: 0.000%  
CV Area: 0.000%

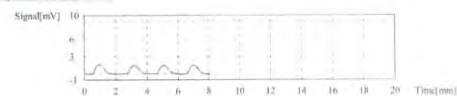


# TOC-Control L Report

2023-11-10 00:00 PM 2:26

Time	Area	Height	Width	Time	Area	Height	Width
0	0.000	0.000	0.000	0	0.000	0.000	0.000
0	0.000	0.000	0.000	0	0.000	0.000	0.000
0	0.000	0.000	0.000	0	0.000	0.000	0.000

Acid Add: 0.000%  
Mean Area: 0.000%  
SD Area: 0.000%  
CV Area: 0.000%



Conc: 5.000mg/L

Time	Area	Height	Width	Time	Area	Height	Width
0	23.13	23.13	23.13	0	23.13	23.13	23.13
0	23.13	23.13	23.13	0	23.13	23.13	23.13
0	23.13	23.13	23.13	0	23.13	23.13	23.13

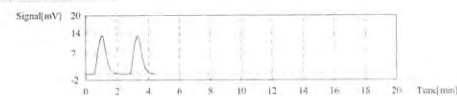
Acid Add: 0.000%  
Mean Area: 23.13%  
SD Area: 0.000%  
CV Area: 0.000%



Conc: 10.00mg/L

Time	Area	Height	Width	Time	Area	Height	Width
0	45.36	45.36	45.36	0	45.36	45.36	45.36
0	45.36	45.36	45.36	0	45.36	45.36	45.36
0	45.36	45.36	45.36	0	45.36	45.36	45.36

Acid Add: 0.000%  
Mean Area: 45.36%  
SD Area: 0.000%  
CV Area: 0.000%



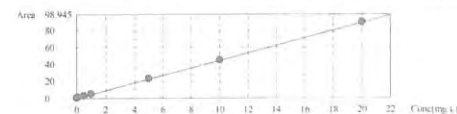
Conc: 20.00mg/L

Time	Area	Height	Width	Time	Area	Height	Width
0	90.72	90.72	90.72	0	90.72	90.72	90.72
0	90.72	90.72	90.72	0	90.72	90.72	90.72
0	90.72	90.72	90.72	0	90.72	90.72	90.72

Acid Add: 0.000%  
Mean Area: 90.72%  
SD Area: 0.000%  
CV Area: 0.000%



Slope: 4.535  
Intercept: 0.000  
r^2: 1.0000  
RSEC (%): 0.00  
Zero Shift: Yes



# TOC-Control L Report

2023-11-10 00:00 PM 2:26

## Inst. Information

Instrument Options  
Catalyst

TOC ASK Unit  
Regular Sensitivity

## Sample

Sample Name  
Sample ID  
Origin  
Status  
Chk. Result

TC 5  
Unlabeled  
TC 0.1 - 20 ppm cal  
Completed

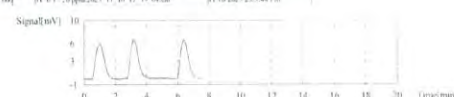
Time	Area	Height	Width	Time	Area	Height	Width
0	1.200	1.200	1.200	0	1.200	1.200	1.200
0	1.200	1.200	1.200	0	1.200	1.200	1.200
0	1.200	1.200	1.200	0	1.200	1.200	1.200

1 Det

Anal: TC

Time	Area	Height	Width	Time	Area	Height	Width
0	22.80	22.80	22.80	0	22.80	22.80	22.80
0	22.80	22.80	22.80	0	22.80	22.80	22.80
0	22.80	22.80	22.80	0	22.80	22.80	22.80

Mean Area: 22.80  
Mean Conc: 5.11mg/L



# TOC-Control L Report

2023-11-10 00:00 PM 2:26

## Inst. Information

Instrument Options  
Catalyst

TOC ASK Unit  
Regular Sensitivity

## Sample

Sample Name  
Sample ID  
Origin  
Status  
Chk. Result

Water  
Unlabeled  
TC 0.1 - 20 ppm cal  
Completed

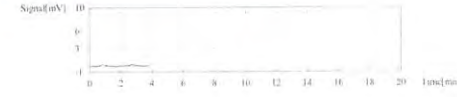
Time	Area	Height	Width	Time	Area	Height	Width
0	1.200	1.200	1.200	0	1.200	1.200	1.200
0	1.200	1.200	1.200	0	1.200	1.200	1.200
0	1.200	1.200	1.200	0	1.200	1.200	1.200

1 Det

Anal: TC

Time	Area	Height	Width	Time	Area	Height	Width
0	0.000	0.000	0.000	0	0.000	0.000	0.000
0	0.000	0.000	0.000	0	0.000	0.000	0.000
0	0.000	0.000	0.000	0	0.000	0.000	0.000

Mean Area: 0.000%  
Mean Conc: 0.11mg/L





ภาคผนวก จ

สำเนาหนังสืออนุญาตขึ้นทะเบียน

ห้องปฏิบัติการวิเคราะห์

ที่ อก ๐๓๑๐(๑)/ ๑๖๑๖๘



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๐ พฤศจิกายน ๒๕๖๖

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๔ สิงหาคม ๒๕๖๖

- สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น  
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ แผ่น  
๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุหนังสือ  
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐  
ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด  
ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

- ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย ตามสิ่งที่ส่งมาด้วย ๑  
ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ ๑๘๑ ราย ตามสิ่งที่ส่งมาด้วย ๒  
ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย น้ำใต้ดิน อากาศเสีย สิ่งปฏิกูล  
หรือวัสดุที่ไม่ใช่แล้ว และดิน ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ กันยายน ๒๕๖๙ หากประสงค์จะต่ออายุหนังสือ  
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อ  
กรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายสิระ จันทน์เจ็ด)

นักวิทยาศาสตร์เชี่ยวชาญ วิชาการราชการแบบ  
ผู้ช่วยราชการกองวิจัยและเตือนภัยมลพิษโรงงาน  
ปฏิบัติการทางธรณีวิทยา กรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๔

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๔๔

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๒๐๔  
ที่ อก ๐๓๑๐(๑)/ ๑๖๑๖๘ ลงวันที่ ๒๐ พฤศจิกายน ๒๕๖๖

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย

- |                              |                            |
|------------------------------|----------------------------|
| ๑) นางสาวยุพาพร จันทร์เปล่ง  | ทะเบียนเลขที่ ๖-๒๐๔-ค-๐๐๐๑ |
| ๒) นางสาวชนัญ โภมารกุล ณ นคร | ทะเบียนเลขที่ ๖-๒๐๔-ค-๐๐๐๒ |
| ๓) นายศรายุทธ จิตรานนท์      | ทะเบียนเลขที่ ๖-๒๐๔-ค-๐๐๐๓ |
| ๔) นางสาวกนกกร เอนก          | ทะเบียนเลขที่ ๖-๒๐๔-ค-๐๐๐๔ |
| ๕) นายสุริยา สอนแก้ว         | ทะเบียนเลขที่ ๖-๒๐๔-ค-๐๐๐๕ |
| ๖) นายวิชาญ ชุนหรีต          | ทะเบียนเลขที่ ๖-๒๐๔-ค-๐๐๐๖ |



เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แล็บอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๒๐๔

ที่ ออก ๐๓๑๐(๑)/ ๑๖๑๖๘ ลงวันที่ ๒๐ พฤศจิกายน ๒๕๖๖

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๘๑ ราย

๑) นายกาจบัณฑิต กิตติคุณชัย	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๑
๒) นายภัทรพล สว่างใจธรรม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๒
๓) นายณราธิป เพ็ญชัยคำ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๓
๔) นายศิริโชค พงษ์ประสม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๔
๕) นายณัฐวุฒิ ตัวงแพ่ง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๕
๖) นางสาวจินดา ไขจุลธรรม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๖
๗) นางสาวสาวิตรี น้อยเสียงม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๗
๘) นางสาวชนัญญาณจน์ อิมขม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๘
๙) นางสาวนรินทร์ สายเล้ง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๙
๑๐) นางสาวนันทิตี สมบูรณ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๐
๑๑) นางสาวศรีธัญญา เฉลิมธำรงค์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๑
๑๒) นางสาวธัญญธร มงคลจิรวุฒิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๒
๑๓) นางสาวศิริลักษณ์ บุญนาค	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๓
๑๔) นายณพพงศ์ จันทร์พันธุ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๔
๑๕) นายนรเศรษฐ์ โกมลาลัย	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๕
๑๖) นายธันวา จรรย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๖
๑๗) นางสาวเกศรินทร์ แก้วมัน	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๗
๑๘) นางสาวสุวิมล ชัยเรืองวุฒิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๘
๑๙) นางสาวสุชาดา ธรรมถาวร	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๙
๒๐) นางสาวเปรมิกา ชัยเดชธนกุล	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๐
๒๑) นางสาวศศิธร หมูสวัสดิ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๑
๒๒) นางสาวเสาวลักษณ์ ภูณภาอำพร	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๒
๒๓) นายอภิสิทธิ์ สิงหา	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๓
๒๔) นายศักดิ์สิทธิ์ โพธิ์สุทนต์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๔
๒๕) ว่าที่ร้อยตรีหญิง พรรณิภา ชำเจริญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๕
๒๖) นางจิตตา คำแก้ว	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๖
๒๗) นางสาวอรรพวรรณ รักยง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๗
๒๘) นางสาวนพรัตน์ แยมกรานต์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๘
๒๙) นายจุลเดช วารินทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๙
๓๐) นางสาวดาญรัตน์ ร้องคำ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๐
๓๑) นายพรมมี ศรีปัตเนตร	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๑
๓๒) นายอุทิศ อุ่นลิ้ม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๒
๓๓) ว่าที่ร้อยตรี เฉลิมเกียรติ อมรศรีเสริม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๓
๓๔) นางสาววริยา สร้างนา	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๔
๓๕) นายอนุพงษ์ รัตนศรีประเสริฐ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๕

วิมล

๓๖) นางสาวจุฑารัตน์...

๓๖) นางสาวจุฑารัตน์ โอนสันเทียะ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๖
๓๗) นางสาวจรรวณ พิมพิกฤตยา	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๗
๓๘) นางสาวปรางค์ทิพย์ กิจไพศาลศักดิ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๘
๓๙) นางสาวเตือนใจ ทางกลาง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๙
๔๐) นางสาวจิราพร ศิริเวช	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๐
๔๑) นายวรากร สุภกริช	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๑
๔๒) นายทง วิริยะสทกิจ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๒
๔๓) นายธนิธ เจนจบ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๓
๔๔) นายคณิศร ชำเพชร	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๔
๔๕) นายภูวิช พรหมสะอาด	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๕
๔๖) นายธนเดช โภคาพิพัฒน์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๖
๔๗) นายชวฤทธิ์ วงษ์จันทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๗
๔๘) นายอาทิตย์ ศรีแสน	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๘
๔๙) นายเจดดินทร์ คงศักดิ์ไทย	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๔๙
๕๐) นายจรัส บุญยิ่ง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๐
๕๑) นายธนาณัติ เอนก	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๑
๕๒) นายอภิวัฒน์ ทุมหนู	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๒
๕๓) นางสาวสุภาวัญ มาก	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๓
๕๔) นางสาวทัตพร ขวาลสมบูรณ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๔
๕๕) นางสาวจิตติมา บุญเพ็ง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๕
๕๖) นางสาวภาณุมาศ นามวัฒน์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๖
๕๗) นางสาวอุไรรัตน์ ทังสร้างแป้น	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๗
๕๘) นายธีรวัฒน์ ปวงสุข	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๘
๕๙) นายอิทธิพล ยะโส	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๕๙
๖๐) นายประพนธ์ วรรณชูชัย	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๐
๖๑) นายชยธร พงทิพย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๑
๖๒) นางสาวกนกวรรณ จันทบาล	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๒
๖๓) นายสิทธิโชค ธงเงิน	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๓
๖๔) นายสิลาวรรณ ใจบุญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๔
๖๕) นางสาวพรรณธิดา พุ่มคง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๕
๖๖) นายณภัทร ศรีวิริยะ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๖
๖๗) นายสุวิชา ทองอ่อน	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๗
๖๘) นายวิญญู บุญตะน้อย	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๘
๖๙) นายสมบูรณ์ บุตรจันทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๙
๗๐) นายวิรัตน์ ไชยชนะรา	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๗๐
๗๑) นายณฤศน์ เพิ่มพูน	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๗๑
๗๒) นายจิรณัฐ ขวาละออ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๗๒
๗๓) นายอัสรี นามบุรี	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๗๓
๗๔) นายอัครเดช จ่อสาว	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๗๔

วิมล

๗๕) นายประเสริฐ...

๗๕) นายประเสริฐ สุระขันธ  
๗๖) นายบุญกุล จันทร์นิยม  
๗๗) นายพิรพงษ์ ทองคุณปรีดา  
๗๘) นายนฤพล ทองนุช  
๗๙) นายอนุวัฒน์ ม่วงแพร่  
๘๐) นายเจตศราวุฒิ ปัตตะมะ  
๘๑) นายกฤษณะ สายวรรณ  
๘๒) นายพิชัย บุญยงค์  
๘๓) นายภาณุพงศ์ โสมวงศ์  
๘๔) นายสามารถ คุ่มปลี  
๘๕) นายสัจชัย โกศรีนาม  
๘๖) นายณัฐวุฒิ ศรีประเสริฐ  
๘๗) นายขวิรัช นาคพนม  
๘๘) นายพงศธร ชัยทิพย์  
๘๙) นายสิทธิโชค ทาสีดา  
๙๐) นายธนากร อินสุตา  
๙๑) นางสาววรรณิษา ขาติวันชัย  
๙๒) นางสาวพิมพ์ตะวัน มินากุล  
๙๓) นางสาวเพชรรัตน์ สิงห์สมบุญ  
๙๔) นางสาวชญาณิน พรหมจันทร์  
๙๕) นายกิตติ ทวีราช  
๙๖) นายจักริน หมั่นวิชา  
๙๗) นายฉัตรชัย สุขเปี้ย  
๙๘) นายณรรนท ต๊ะทองคำ  
๙๙) นายศุภยพล สนนอก  
๑๐๐) นายทักษ์ดนัย อุบลศรี  
๑๐๑) นายอนศวร นามะกุลณนา  
๑๐๒) นายธิตินพงศ์ บัวแดง  
๑๐๓) นายณนทชัย อุปถัมภ์  
๑๐๔) นายรัฐพล คุณสุทธิ  
๑๐๕) นายณนทวัฒน์ สาริน  
๑๐๖) นายปิยะนัฐ พลมะศรี  
๑๐๗) นายพงศ์สิริ โสมเขียว  
๑๐๘) นายพรพัฒน์ กำคำ  
๑๐๙) นายภาณุพงศ์ มานิตย์  
๑๑๐) นายมงคล ผลาทิพย์  
๑๑๑) นายสิรินนท ทองอิน  
๑๑๒) นายอเนชา พันสมัย  
๑๑๓) นายอดิศักดิ์ ผมไผ

ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๕  
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ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๑๓

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๑๑๔) นายอนันตชัย...

๑๑๕) นายอนันตชัย วิสม  
๑๑๖) นายวรุจ ตีนัก  
๑๑๗) นายแสงตะวัน นทะสัด  
๑๑๘) นายยุทธพงศ์ รัตนะ  
๑๑๙) นายชัยณัฐ ไชยชนะ  
๑๒๐) นายวิศรุต ศรีธรรมมา  
๑๒๑) นายนนทกร เผือกผ่อง  
๑๒๒) นายกำชัย สุทธะ  
๑๒๓) นางสาวณัฐกรณ์ บุญตะนัย  
๑๒๔) นางสาวพัชรินทร์ แสนสร้อย  
๑๒๕) นายไพรัชย์ เปี่ยมพิมาย  
๑๒๖) นางสาวศุภมาส ทองมาก  
๑๒๗) นางสาวลลิตา จิตรสว่าง  
๑๒๘) นางสาวไมพร เล็กภูเขียว  
๑๒๙) นางสาวกฤติมาพร คำมีแก่น  
๑๓๐) นางสาวสกุรัตน์ ภาควง  
๑๓๑) นางสาวไพรินทร์ ศรีรูป  
๑๓๒) นางสาวทิพนตร ผุยปัญญา  
๑๓๓) นางสาวธิดา ปานทอง  
๑๓๔) นางสาวอรสา ทองนวล  
๑๓๕) นางสาวอรยา คำคลอง  
๑๓๖) นางสาวบุศกรณ สุนทรสนาน  
๑๓๗) นางสาวอัญชลี คำจันทร์  
๑๓๘) นายบุญฤทธิ์ เอี่ยมเทศ  
๑๓๙) นางสาวศุภรดา บันมยุรา  
๑๔๐) นางสาวจิราเจต พองดา  
๑๔๑) นางสาวอารยา มีชัย  
๑๔๒) นางสาววิชชุดา นาคผจญ  
๑๔๓) นางสาวนันทิยา จันทะสุน  
๑๔๔) นายกิตติพงศ์ แซ่ลี  
๑๔๕) นายอนุวัติ ภูถวิล  
๑๔๖) นายธีรพล แสงทอง  
๑๔๗) นายศักดิ์พิพัฒน์ บุญมัน  
๑๔๘) นายฐิตินันท์ เอมอุไร  
๑๔๙) นายชัยณรงค์ ศรีบุรินทร์  
๑๕๐) นางสาวอัจฉราวรรณ สวนสนอง  
๑๕๑) นางสาวณัฐราพร สิงหา  
๑๕๒) นายกัมเรศ แหมนโต

ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๑๔  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๑๕  
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๑๕๓) นางสาวอุบล...



- ๕ -

๑๕๓) นางสาวอุบล เคิกศิริ  
๑๕๔) นางสาวมนรัตน์ ทองบุตร  
๑๕๕) นายภาคภูมิ แทนไทย  
๑๕๖) นางสาวสุภาณัฐ เมสท์วงศ์  
๑๕๗) นางสาวพรทิศา สาตาพนม  
๑๕๘) นายเอกวิทย์ วันทะนา  
๑๕๙) นายไตรมณฑล ทิพย์วรรณ  
๑๖๐) นายจิรเมธ ประเสริฐศิริพงศ์  
๑๖๑) นายจิรายุส เกษมสุข  
๑๖๒) นายจิรศักดิ์ ศรีวิชัย  
๑๖๓) นายณัฐฤกษ์ สหพานแก้ว  
๑๖๔) นายบุรณศักดิ์ ปะที  
๑๖๕) นายปิ่นณวิชัย เสมอทรัพย์  
๑๖๖) นายพิษณุพงษ์ ไชยา  
๑๖๗) นายภัทรพงษ์ มณฑาทอง  
๑๖๘) นายสันต์ ตรีนกุล  
๑๖๙) นายภาณุเดช เพชรสุด  
๑๗๐) นายอนุกุล วิลละแสง  
๑๗๑) นายภัทรพงษ์ มีสุข  
๑๗๒) นางสาวนุชรี สิละทีป  
๑๗๓) นางสาวสุภาวดี โกศรนาม  
๑๗๔) นางสาวอรณิชา เทียนคำ  
๑๗๕) นางสาวพรเพ็ญ ขอบสอน  
๑๗๖) นางสาววันวิสา ขอนพิกุล  
๑๗๗) นางสาวอรรณณ เถาว์ทอง  
๑๗๘) นางสาวอัยยลีน เมอร์วินณ์  
๑๗๙) นางสาววิสรา คัญครอง  
๑๘๐) นายวุฒิกร ศิริวรรณ  
๑๘๑) นางสาวจรรณณ กระจำพันธุ์

ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๕๓  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๕๔  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๕๕  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๕๖  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๕๗  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๕๘  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๕๙  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๐  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๑  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๒  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๓  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๔  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๕  
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ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๗  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๘  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๙  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๗๐  
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ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๗๕  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๗๖  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๗๗  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๗๘  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๗๙  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๘๐  
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๘๑

Signature

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๒๐๔  
ที่อก ๐๓๑๐(๑)/ ๑๖ ๑ ๖ ๘ ลงวันที่ ๒๐ พฤศจิกายน ๒๕๖๖

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๗๔ รายการ

น้ำเสีย จำนวน 60 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldicarb	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
2	Aldicarb Sulfone	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
3	Aldicarb Sulfoxide	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
4	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
5	Arsenic	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
6	Barium	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
7	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
8	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
9	δ-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
10	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
11	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method <sup>[4]</sup> 2) 5-Day BOD Test, Membrane Electrode Method <sup>[4]</sup>
12	Carbaryl	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
13	Carbofuran	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
14	Cadmium	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
15	Chemical Oxygen Demand	1) Closed Reflux, Colorimetric Method <sup>[4]</sup> 2) Closed Reflux, Titrimetric Method <sup>[4]</sup>
16	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
17	Chromium	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
18	Color	ADMI Weighted-Ordinate Spectrophotometric Method <sup>[4]</sup>



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
19	Copper	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
20	Cyanide	Distillation, Colorimetric Method <sup>[4]</sup>
21	2,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
22	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
23	2,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
24	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
25	2,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
26	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
27	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
28	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
29	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
30	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
31	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
32	Endrin Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
33	Formaldehyde	Distillation, Colorimetric Method <sup>[3]</sup>
34	Free Chlorine	1) DPD Ferrous Titrimetric Method <sup>[4]</sup> 2) DPD Colorimetric Method <sup>[4]</sup>
35	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
36	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
37	Hexavalent Chromium	Colorimetric Method <sup>[4]</sup>
38	3-Hydroxycarbofuran	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
39	Lead	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>

40 Manganese...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
40	Manganese	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
41	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass spectrometric Method <sup>[4]</sup>
42	Methiocarb	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
43	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
44	Methomyl	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
45	Nickel	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
46	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method <sup>[4]</sup> 2) Soxhlet Extraction Method <sup>[4]</sup>
47	Oxamyl	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
48	Propoxur	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
49	pH	Electrometric Method <sup>[4]</sup>
50	Phenols	1) Distillation, Chloroform Extraction Method <sup>[4]</sup> 2) Distillation, Direct Photometric Method <sup>[4]</sup>
51	Selenium	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
52	Sulfide	Iodometric Method <sup>[4]</sup>
53	Temperature	Laboratory and Field Methods <sup>[4]</sup>
54	Total Dissolved Solids	Dried at 180 °C <sup>[4]</sup>
55	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method <sup>[4]</sup>
56	Total Phosphorous	Digestion, Colorimetric Method <sup>[4]</sup>
57	Total Suspended Solids	Dried from 103-105 °C <sup>[4]</sup>
58	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
59	Trivalent Chromium	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation <sup>[4]</sup>
60	Zinc	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[4]</sup>

น้ำใต้ดิน...



น้ำใต้ดิน จำนวน 126 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
5	Antimony	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
8	Barium	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
9	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
13	Benzoic Acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
15	Benzo[g,h,i]perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>

18 Bis(2-ethylhexyl)phthalate...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
27	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
33	Chromium	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation <sup>[4]</sup>
35	Chromium (VI)	Colorimetric Method <sup>[4]</sup>

36 Chrysene...



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
36	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
37	Cyanide	Distillation, Colorimetric Method <sup>(4)</sup>
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
39	DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
40	DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
41	DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
42	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
43	Di-n-Butyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
47	3,3-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
57	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
58	Diethyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
63	Di-n-octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
64	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
65	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
68	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
69	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
70	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
74	α-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
75	β-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
76	γ-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
81	Lead	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
82	Manganese	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
83	Mercury	1) Digestion, Cold Vapor Atomic Absorption Spectrometric Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
84	Methanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
86	Methyl bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
87	Methylene chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
89	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
90	Methyl tert-butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
92	Nickel	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>

94 N-Nitrosodiphenylamine...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
95	N-Nitrosodi-n-Propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
96	Polychlorinated Biphenyls - PCB 1016 - PCB 1221 - PCB 1232 - PCB 1242 - PCB 1248 - PCB 1254 - PCB 1260	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
98	pH	Electrometric Method <sup>[4]</sup>
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
100	Phenol	1) Distillation, Chloroform Extraction Method <sup>[4]</sup> 2) Distillation, Direct Photometric Method <sup>[4]</sup> 3) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
102	Selenium	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
103	Silver	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[4]</sup>
104	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
105	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
106	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
107	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
109	TPH (C <sub>5</sub> -C <sub>8</sub> )	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[14,25]</sup>

110 TPH (C<sub>9</sub>-C<sub>16</sub>)...



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
110	TPH (C <sub>8</sub> -C <sub>16</sub> )	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[9,22]</sup>
111	TPH (C <sub>16</sub> -C <sub>35</sub> )	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[9,22]</sup>
112	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
113	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
114	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
118	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
119	Vanadium	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[4]</sup>
120	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
121	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
122	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
123	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
124	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
125	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[4]</sup>
126	Zinc	1) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[4]</sup>

อากาศเสีย...

## อากาศเสีย (ปล่อยระบาย) จำนวน 28 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[5]</sup>
2	Arsenic	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[5]</sup>
3	Beryllium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[5]</sup>
4	Cadmium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[5]</sup>
5	Carbon Monoxide	1) Instrumental Analyzer Method <sup>[5]</sup> 2) Sampling Bag Non-Dispersive Infrared Method <sup>[5]</sup>
6	Chlorine	1) Absorption Sampling, Ion Chromatographic Method <sup>[5]</sup> 2) Isokinetic Sampling, Ion Chromatographic Method <sup>[5]</sup>
7	Chromium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[5]</sup>
8	Cobalt	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[5]</sup>
9	Copper	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[5]</sup>
10	Cresol	Adsorption Sampling, Gas Chromatographic Method <sup>[5]</sup>
11	Dioxins	Isokinetic Sampling <sup>[5]</sup>
12	Hydrogen Chloride	1) Absorption Sampling, Ion Chromatographic Method <sup>[5]</sup> 2) Isokinetic Sampling, Ion Chromatographic Method <sup>[5]</sup>
13	Hydrogen Fluoride	1) Absorption Sampling, Ion Chromatographic Method <sup>[5]</sup> 2) Isokinetic Sampling, Ion Chromatographic Method <sup>[5]</sup>
14	Hydrogen Sulfide	Absorption Sampling, Iodometric Method <sup>[5]</sup>

15 Lead...



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
15	Lead	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[5]</sup>
16	Manganese	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[5]</sup>
17	Mercury	1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method <sup>[5]</sup>
18	Nickel	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[5]</sup>
19	Opacity	Ringelmann's Method <sup>[2]</sup>
20	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method <sup>[5]</sup> 2) Absorption Sampling, Alkaline Permanganate/Colorimetric Method <sup>[5]</sup> 3) Instrumental Analyzer Method <sup>[5]</sup>
21	Selenium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[5]</sup>
22	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method <sup>[5]</sup> 2) Instrumental Analyzer Method <sup>[5]</sup>
23	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method <sup>[5]</sup>
24	Tellurium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[5]</sup>
25	Tin	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[5]</sup>
26	Total Suspended Particulate	1) Isokinetic Sampling, Gravimetric Method <sup>[5]</sup> 2) Paired Train, Isokinetic Sampling, Gravimetric Method <sup>[5]</sup>

27 Vanadium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Vanadium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[5]</sup>
28	Xylene	Adsorption Sampling, Gas Chromatographic Method <sup>[5]</sup>

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,26]</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,26]</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,26]</sup>
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,16]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1,6,17]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[7,17]</sup>
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,16]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1,6,17]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[7,17]</sup>
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,16]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1,6,17]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[7,17]</sup>

5 Beryllium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
8	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
9	Chromium (III)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method <sup>(1,6,16,19)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method <sup>(1,6,17,19)</sup> 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method <sup>(7,8,16,19)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method <sup>(7,8,17,19)</sup>

10 Chromium (VI)...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method <sup>(1,6,19)</sup> 2) Alkaline Digestion, Colorimetric Method <sup>(8,19)</sup>
11	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
12	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup>

2) Soxhlet...



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	Dieldrin	2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup> 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,26]</sup> 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,26]</sup> 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,26]</sup> 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
20	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,16]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1,6,17]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[7,17]</sup>
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,26]</sup> 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[1,6,20]</sup> 2) Waste Extraction, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method <sup>[1,6,30]</sup> 3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[20]</sup> 4) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method <sup>[30]</sup> 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method <sup>[21]</sup>
23	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,26]</sup> 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic /Mass Spectrometric Method <sup>[11,26]</sup>
24	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,26]</sup> 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic /Mass Spectrometric Method <sup>[11,26]</sup>
25	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,16]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1,6,17]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[7,17]</sup>
26	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,16]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1,6,17]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[7,17]</sup>
27	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,26]</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,26]</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>[11,26]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	<ul style="list-style-type: none"> <li>- 2-Chlorobiphenyl</li> <li>- 2,3-Dichlorobiphenyl</li> <li>- 2,2',5-Trichlorobiphenyl</li> <li>- 2,4',5-Trichlorobiphenyl</li> <li>- 2,2',3,5'-Tetrachlorobiphenyl</li> <li>- 2,2',5,5'-Tetrachlorobiphenyl</li> <li>- 2,3',4,4'-Tetrachlorobiphenyl</li> <li>- 2,2',3,4,5'-Pentachlorobiphenyl</li> <li>- 2,2',4,5,5'-Pentachlorobiphenyl</li> <li>- 2,3,3',4',6-Pentachlorobiphenyl</li> <li>- 2,2',3,4,4',5'-Hexachlorobiphenyl</li> <li>- 2,2',3,4,5,5'-Hexachlorobiphenyl</li> <li>- 2,2',3,5,5',6-Hexachlorobiphenyl</li> <li>- 2,2',4,4',5,5'-Hexachlorobiphenyl</li> <li>- 2,2',3,3',4,4',5-Heptachlorobiphenyl</li> <li>- 2,2',3,4,4',5,5'-Heptachlorobiphenyl</li> <li>- 2,2',3,4,4',5',6-Heptachlorobiphenyl</li> <li>- 2,2',3,4',5,5',6-Heptachlorobiphenyl</li> <li>- 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl</li> </ul>	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,26]</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,26]</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,26]</sup> Electrometric Method <sup>[23,24]</sup>
29	pH	
30	Selenium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,16]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1,6,17]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[7,17]</sup>

31 Silver...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
31	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,16]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1,6,17]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[7,17]</sup>
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,16]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1,6,17]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[7,17]</sup>
33	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,26]</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,26]</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[11,26]</sup>
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,16]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1,6,17]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[7,17]</sup>
35	Zinc	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,16]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1,6,17]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[7,17]</sup>

ดิน...



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
2	Acetone	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup> 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method <sup>(13)</sup>
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
4	Anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
5	Antimony	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
8	Barium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>
9	Benz(a)anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[7,17]</sup>
24	Carbazole	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
28	p-Chloroaniline	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
32	2-Chlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
33	Chromium	1) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[7,17]</sup>
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method <sup>[7,8,16,19]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method <sup>[7,8,17,19]</sup>
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method <sup>[8,19]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
36	Chrysene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
37	Cyanide	Extraction, Distillation, Colorimetric Method <sup>[27,28,29]</sup>
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
39	DDD	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
40	DDE	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
41	DDT	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
42	Dibenz(a,h)anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
43	Di-n-Butyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
47	3,3-Dichlorobenzidine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
53	2,4-Dichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
57	Dieldrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
58	Diethyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
59	2,4-Dimethylphenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
60	2,4-Dinitrophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
61	2,4-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
62	2,6-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>

63 Di-n-Octyl Phthalate...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
63	Di-n-Octyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
64	Endosulfan	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
65	Endrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
67	Fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
68	Fluorene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
69	Heptachlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
70	Heptachlor epoxide	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
71	Hexachlorobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
73	n-Hexane	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup> 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method <sup>(13)</sup>

73 n-Hexane...



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
74	$\alpha$ -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
75	$\beta$ -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
76	$\gamma$ -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
77	Hexachlorocyclopentadiene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
78	Hexachloroethane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
79	Indeno(1,2,3-cd)pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
80	Isophorone	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
81	Lead	1) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[7,17]</sup>
82	Manganese	1) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[7,17]</sup>
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[20]</sup> 2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry <sup>[21]</sup> 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method <sup>[30]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup> 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,25]</sup>
85	Methoxychlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
88	2-methylphenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
89	2-Methylnaphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
91	Naphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
92	Nickel	1) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[7,17]</sup>
93	Nitrobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
94	N-Nitrosodiphenylamine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
95	N-Nitrosodi-n-propylamine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
96	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4',6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5,6-Heptachlorobiphenyl - 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl - Pentachlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
97	Phenanthrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
98	Phenanthrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
99	Phenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
100	Pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
101	Selenium	1) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[7,17]</sup>
102	Silver	1) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[7,17]</sup>
103	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
106	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
107	Toxaphene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
108	TPH (C <sub>5</sub> -C <sub>8</sub> )	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
109	TPH (C <sub>9</sub> -C <sub>16</sub> )	1) Automate Extraction, Gas Chromatographic Method <sup>[11,22]</sup> 2) Solvent Extraction, Gas Chromatographic Method <sup>[12,22]</sup> 3) Ultrasonic Extraction, Gas Chromatographic Method <sup>[22,31]</sup>
110	TPH (C <sub>16</sub> - C <sub>35</sub> )	1) Automate Extraction, Gas Chromatographic Method <sup>[11,22]</sup> 2) Solvent Extraction, Gas Chromatographic Method <sup>[12,22]</sup> 3) Ultrasonic Extraction, Gas Chromatographic Method <sup>[22,31]</sup>
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
115	2,4,5-Trichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
116	2,4,6-Trichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,26]</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[11,26]</sup>
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
118	Vanadium	1) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[7,17]</sup>
119	Vinyl Acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
120	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
121	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
122	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
123	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[15,25]</sup>
125	Zinc	1) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[7,17]</sup>

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31/10/2561



ที่ อก ๐๓๓๐(๑)/ ๔ ๑ ๒ ๑

กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๕ เมษายน ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๒๔ มีนาคม ๒๕๖๗

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓ ราย

- |                          |                            |
|--------------------------|----------------------------|
| ๑) นางสาวพรรณธิดา พุ่มคง | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๕ |
| ๒) นายกำชัย สุทธิระ      | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๒๑ |
| ๓) นางสาวศุภรดา ปันมยุรา | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๓๘ |

๒. ให้เพิ่มเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๑๒ ราย

- |                             |                            |
|-----------------------------|----------------------------|
| ๑) นางสาวฐานิดา กลิ่นเขียว  | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๘๒ |
| ๒) นางสาวกัญญ์กัสน์ สายคำ   | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๘๓ |
| ๓) นางสาวณัฐนันท์ กันทะวงศ์ | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๘๔ |
| ๔) นายอำนาจ วงษาเคน         | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๘๕ |
| ๕) นายฤทธิพล ปิณญาวงค์      | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๘๖ |
| ๖) นายณชากร หารรักษา        | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๘๗ |
| ๗) นายวิชรินทร์ ผ่องสามสวน  | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๘๘ |
| ๘) นายณัฐพงศ์ โสภ           | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๘๙ |
| ๙) นายศักรินทร์ ปานเพ็ง     | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๙๐ |
| ๑๐) นายณัฐพล ชุ่มชื่น       | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๙๑ |
| ๑๑) นายธนา สุภาพันธ์        | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๙๒ |
| ๑๒) นายนราธร แก้วพงษ์ชา     | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๙๓ |

อนึ่ง หนึ่งสิ่งฉบับนี้...

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
ในวันที่ ๒ กันยายน ๒๕๖๔

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

ก

(นายพรยศ กลั่นกรอง)

รองอธิบดี ปฏิบัติราชการแทน

อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๔๔

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



ที่ อก ๐๓๓๐(๓)/ ๖๔๗๐

กรมโรงงานอุตสาหกรรม

ถนนพระรามที่ ๖ แขวงทุ่งพญาไท

เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๘ มิถุนายน ๒๕๖๔

เรื่อง ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๒๔ เมษายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๒ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอขึ้นทะเบียน  
ห้องปฏิบัติการวิเคราะห์เอกชน พร้อมรายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ เจ้าหน้าที่ประจำ  
ห้องปฏิบัติการวิเคราะห์ และรายการสารมลพิษที่จะทำการวิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป  
(ประเทศไทย) จำกัด ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน มีเลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่  
๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู้ อำเภอบลวกแดง จังหวัดระยอง โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

๑) นายเดช ช้างชน ทะเบียนเลขที่ ว-๓๒๓-ค-๔๔๔๒

๒) นางวิลาวัลย์ บริรักษ์ ทะเบียนเลขที่ ว-๓๒๓-ค-๔๔๔๓

๓) นายสุพจน์ สลามเต๊ะ ทะเบียนเลขที่ ว-๓๒๓-ค-๔๔๔๔

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

๑) นางสาวณมล บรรจงกิจ ทะเบียนเลขที่ ว-๓๒๓-จ-๔๔๔๕

๒) นางพจนา สีดา ทะเบียนเลขที่ ว-๓๒๓-จ-๔๔๔๖

๓) นางสาวธนิศา กุลสุริวงศ์ ทะเบียนเลขที่ ว-๓๒๓-จ-๔๔๔๗

๔) นายพิทยา ทองแดง ทะเบียนเลขที่ ว-๓๒๓-จ-๔๔๔๘

๕) นางชลธิชา สุปงกช ทะเบียนเลขที่ ว-๓๒๓-จ-๔๔๔๙

๖) ว่าที่ ร.ต.รณชัย ม่วงมา ทะเบียนเลขที่ ว-๓๒๓-จ-๔๔๕๐

๗) นายวราวุฒิ หับพา ทะเบียนเลขที่ ว-๓๒๓-จ-๔๔๕๑

๘) นายศักดิ์รินทร์ จรัสกาย ทะเบียนเลขที่ ว-๓๒๓-จ-๔๔๕๒

๙) นายสุรศักดิ์ สาขิน ทะเบียนเลขที่ ว-๓๒๓-จ-๔๔๕๓

๑๐) นางสาวเพชรคุณ ภวภูตานนท์ ทะเบียนเลขที่ ว-๓๒๓-จ-๔๔๕๔

๑๑) นายสถาพร ถาแก้ว ทะเบียนเลขที่ ว-๓๒๓-จ-๔๔๕๕

๑๒) นายสุทธิดำรงค์ โชคปิตินันท์ ทะเบียนเลขที่ ว-๓๒๓-จ-๔๔๕๖

๑๓) นายวัลลภ...





๑๓) นายวัลลภ หันไชยเนาว์  
๑๔) นางสาววนาลี เจริญตระกูล  
๑๕) นางสาววนิดา ผดุงจิตต์  
๑๖) นายธนะสิทธิ์ วงศ์ไชย  
๑๗) นายชัยนุสรณ์ เลิศนันทกุลชัย  
๑๘) นายลิจจา เพ็ชรแสง  
๑๙) นายกันตภณ มณีสัมพันธ์  
๒๐) นางสาวจินตนิย โกเมนชนะ  
๒๑) นายธารินทร์ อ็อกจินดา  
๒๒) นายศุภณัฐ พิสัยพันธ์  
๒๓) นายศุภชัย วงศ์สุริยฉาย  
๒๔) นายปฐมพงศ์ กรสวีสดี  
๒๕) นายไสว ตันโพธิ์  
๒๖) นางสาวกิตติยา สัณญาอริยาภรณ์  
๒๗) นางสาวเจษฎาพร ศรีบุญเรือง  
๒๘) นางสาวมธุรินทร์ สิงห์เงา  
๒๙) นางสาวธิดารัตน์ ศิริมงคลโร  
๓๐) นายพิพัฒน์ นิภัทร์เศรษฐ์  
๓๑) นายศิริวิทย์ เรืองสม  
๓๒) นายปารเมศ สัตยาคุณ  
๓๓) นายณณนาท ธรรมสระโร  
๓๔) นางสาวศุภรัตน์ ไสจันทร์  
๓๕) นายพชรกร อินทรเสนา  
๓๖) นายทิวากร เชื้อมาก  
๓๗) นายอนุรักษ ทองขจรศักดิ์  
๓๘) นายอภิชาติ วิชาศ  
๓๙) นายจรัสระวี ศรีรักษา  
๔๐) นายประสานมิตร เชื้อนเพชร  
๔๑) นายภาณุวัฒน์ ว่างบ  
๔๒) นายสันติ ชัยชนะ  
๔๓) นายสิทธิชัย แก้วเกตุ  
๔๔) นายทินกร กุลชาติ

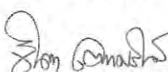
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ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๘๙

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๑๔ รายการ  
อากาศเสีย (ปล่อยระบาย) จำนวน ๗ รายการ และน้ำใต้ดิน จำนวน ๓ รายการ รวมทั้งสิ้นจำนวน ๒๔ รายการ  
ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้มีอายุ ๓ ปี นับจากวันที่กรมโรงงานอุตสาหกรรมออกหนังสือ หากประสงค์  
จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบ  
คำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการ  
วิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

  
(นางจินดา เดชะศรีรินทร์)

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน  
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

๒๘ มิ.ย. ๒๕๖๔

กองวิจัยและเตือนภัยมลพิษโรงงาน  
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก  
โทร. ๐ ๓๘๐๕ ๗๒๖๑-๓  
ไปรษณีย์อิเล็กทรอนิกส์ [ejw@diw.mail.go.th](mailto:ejw@diw.mail.go.th)

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๓๒๓

ที่ อก ๐๓๑๐(๓)/ ๖๔๗๐

ลงวันที่ ๒๘ มิถุนายน ๒๕๖๕

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๔ รายการ

น้ำเสีย จำนวน 14 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method <sup>[2]</sup> 2) 5-Day BOD Test, Azide Modification Method <sup>[2]</sup>
2	Chemical Oxygen Demand	1) Open Reflux, Titrimetric Method <sup>[2]</sup> 2) Closed Reflux, Colorimetric Method <sup>[2]</sup> 3) Closed Reflux, Titrimetric Method <sup>[2]</sup>
3	Color	ADMI Weighted – Ordinate Spectrophotometric Method <sup>[2]</sup>
4	Cyanide	Distillation, Colorimetric Method <sup>[2]</sup>
5	Formaldehyde	Distillation, Colorimetric Method <sup>[1]</sup>
6	Free Chlorine	DPD-Ferrous Titrimetric Method <sup>[2]</sup>
7	Oil and Grease	Liquid-Liquid Partition-Gravimetric Method <sup>[2]</sup>
8	pH	Electrometric Method <sup>[2]</sup>
9	Phenols	1) Distillation, Chloroform Extraction Method <sup>[2]</sup> 2) Distillation, Direct Photometric Method <sup>[2]</sup>
10	Sulfide	ZnS Precipitation, Iodometric Method <sup>[2]</sup>
11	Temperature	Laboratory and Field Method <sup>[2]</sup>
12	Total Dissolved Solids	Dried at 180 °C <sup>[2]</sup>
13	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method <sup>[2]</sup>
14	Total Suspended Solids	Dried at 103-105 °C <sup>[2]</sup>

อากาศเสีย (ปล่องระบาย) จำนวน 7 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Carbon Monoxide	1) Sampling Bag, Non-Dispersive Infrared Method <sup>[5]</sup> 2) Instrumental Analyzer Method <sup>[8]</sup>
2	Hydrogen Sulfide	Absorption Sampling, Iodometric Method <sup>[5]</sup>
3	Opacity	Ringelmann's Method <sup>[3,4]</sup>
4	Oxide of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method <sup>[6]</sup> 2) Instrumental Analyzer Method <sup>[9]</sup>
5	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method <sup>[5]</sup> 2) Instrumental Analyzer Method <sup>[10]</sup>

วิศวะ สัมฤทธิ์

(นางสาววิชุดา สัมฤทธิ์ผล)

ผู้อำนวยการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

Sulfuric Acid...

-2-

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
6	Sulfuric Acid	Isokinetic Sampling, Barium – Thorin Titrimetric Method <sup>[6]</sup>
7	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method <sup>[7]</sup>

น้ำใต้ดิน จำนวน 3 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method <sup>[2]</sup>
2	pH	Electrometric Method <sup>[2]</sup>
3	Phenols	Distillation, Direct Photometric Method <sup>[2]</sup>

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วิศวะ สัมฤทธิ์

(นางสาววิชุดา สัมฤทธิ์ผล)

ผู้อำนวยการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก กองวิจัยและเตือนภัยมลพิษโรงงาน กรมโรงงานอุตสาหกรรม โทร ๐ ๓๘๐๕ ๗๖๖๓-๓



# สำเนา

ที่ อก ๐๓๒๐/ ๒๐๕๓

กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๒ มี.ค. ๒๕๖๖

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอเปลี่ยนแปลงบุคลากร ของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๔ มีนาคม ๒๕๖๖

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู้ อำเภอปลวกแดง จังหวัดระยอง ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

ก. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ ราย

- |                              |               |              |
|------------------------------|---------------|--------------|
| ๑) นางสาวเจษฎาพร ศรีบุญเรือง | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๗๑ |
| ๒) นางสาวมธุรินทร์ สิงห์เงา  | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๗๒ |
| ๓) นางสาววนิดา ผดุงจิตต์     | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๕๙ |
| ๔) นายศุภณัฐ พิสัยพันธ์      | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๖๖ |
| ๕) นายสิทธิชัย แก้วเกตุ      | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๘๗ |

ข. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๒ ราย

- |                              |               |              |
|------------------------------|---------------|--------------|
| ๑) นายณัฐพงษ์ เพ็งขาวนา      | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๑ |
| ๒) นางสาวกัลยพรรณ รักดี      | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๒ |
| ๓) นางสาวจุฑารัตน์ สีทองกลาง | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๓ |
| ๔) นางสาวจิตสุภา ประเทืองสุข | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๔ |
| ๕) นายสรสรเสริฐ คุ้ยยกสุย    | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๕ |
| ๖) นายณัฐวุฒิ ออมพรมราช      | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๖ |
| ๗) นายจิตรกร สีวะสา          | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๗ |
| ๘) นายสิทธิพงษ์ สุวรรณรัตน์  | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๘ |
| ๙) นายสิทธิพันธ์ เสนาชีว     | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๙ |
| ๑๐) นายอนุวัฒน์ เตมา         | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๑๐ |
| ๑๑) นายสุรวิทย์ นราพงษ์      | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๑๑ |
| ๑๒) นายอดิศักดิ์ ตะริศบุญ    | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๑๒ |

อนึ่ง...

-๒-

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ที่ อก ๐๓๑๐(๓)/๖๔๗๐ ลงวันที่ ๒๘ มิถุนายน ๒๕๖๔ คือในวันที่ ๒๘ มิถุนายน ๒๕๖๗ ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรมตาม QR Code ท้ายหนังสือนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายทวี อำพาพันธ์)

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก  
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓ ๖๐๕๙ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ [eirw@diw.mail.go.th](mailto:eirw@diw.mail.go.th)



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์





ที่ อก ๐๓๒๐/๒๕๖๕

กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๐ พ.ย. ๒๕๖๕

เรื่อง เปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๕ ตุลาคม ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำนวน ๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู้ อำเภอปลวกแดง จังหวัดระยอง ขอเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เพิ่มขอขยายสารมลพิษที่วิเคราะห์ในน้ำเสีย จำนวน ๑๓ รายการ และน้ำใต้ดิน ๓ รายการ ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะมีผลใช้บังคับเมื่อได้รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชนที่ อก ๐๓๑๐(๓)/๒๕๖๕ ลงวันที่ ๒๘ มิถุนายน ๒๕๖๕ คือในวันที่ ๒๘ มิถุนายน ๒๕๖๕ ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายทวี อำพันรัตน์)

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก  
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓ ๖๐๕๙ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th



“อุตสาหกรรมก้าวหน้า ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๓๒๓  
ที่ อก ๐๓๒๐/๒๕๖๕ ลงวันที่ ๑๐ พ.ย. ๒๕๖๕

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๖ รายการ  
น้ำเสีย จำนวน 13 รายการ

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method 2) 5-Day BOD Test, Azide Modification Method
2	Chemical Oxygen Demand	1) Open Reflux, Titrimetric Method 2) Closed Reflux, Colorimetric Method 3) Closed Reflux, Titrimetric Method
3	Color	ADMI Weighted-Ordinate Spectrophotometric Method
4	Cyanide	Distillation, Colorimetric Method
5	Free Chlorine	DPD Ferrous Titrimetric Method
6	Oil and Grease	Liquid-Liquid, Partition-Gravimetric Method
7	pH	Electrometric Method
8	Phenols	1) Distillation, Chloroform Extraction Method 2) Distillation, Direct Photometric Method
9	Sulfide	ZnS Precipitation, Iodometric Method
10	Temperature	Field Method
11	Total Dissolved Solids	Dried at 180 °C
12	Total Kjeldahl Nitrogen	Semi-Macro Kjeldahl Method
13	Total Suspended Solids	Dried at 103-105 °C

น้ำใต้ดิน จำนวน 3 รายการ

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method
2	pH	Electrometric Method
3	Phenols	Distillation, Direct Photometric Method

เอกสารอ้างอิง

APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 24<sup>th</sup> ed. Washington, DC : APHA, 2023



ที่ อก ๐๓๒๐/ ๔๖๐๐ 1



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๔ พฤษภาคม ๒๕๖๓

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบลอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน

ลงวันที่ ๒๐ มีนาคม ๒๕๖๓

ตามคำขอ ที่อ้างถึง บริษัท เอแอลเอส แลบลอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู้ อำเภอลำลูกนาง จังหวัดระยอง ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑ ราย

นางสาวเพชรคุณ ภาณุตานนท์ ทะเบียนเลขที่ ๖-๓๒๓-จ-๔๔๕๔

๒. ให้เพิ่มเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๑๕ ราย

๑) นายณัฐพล เจียงวรวงศ์ ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๑๓

๒) นายชานนท์ บุญชื่น ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๑๔

๓) นายณัฐกานต์ วงศ์อินทร์อยู่ ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๑๕

๔) นายอานนท์ โพธิ์พระทอง ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๑๖

๕) นายณัฏฐพล ถ้ำกลาง ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๑๗

๖) นายศุภณัฐ พิสัยพันธ์ ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๑๘

๗) นายสันต์ คินันติ ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๑๙

๘) นายวรวิญญู ฉิมพาลี ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๒๐

๙) นายศุภณัฐ สกุณกิตติมงคล ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๒๑

๑๐) นายเอกชัย ถิ่นทอง ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๒๒

๑๑) นายพงษ์เทพ สิทธิเลาะ ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๒๓

๑๒) นายทินกร กุมภาชี ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๒๔

๑๓) นางสาวนันทิยา บุญจั่น ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๒๕

๑๔) นายสิทธิชัย ยันพิมาย ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๒๖

๑๕) นางสาวภาณิน หลอดทอง ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๒๗

อนึ่ง...



- ๒ -

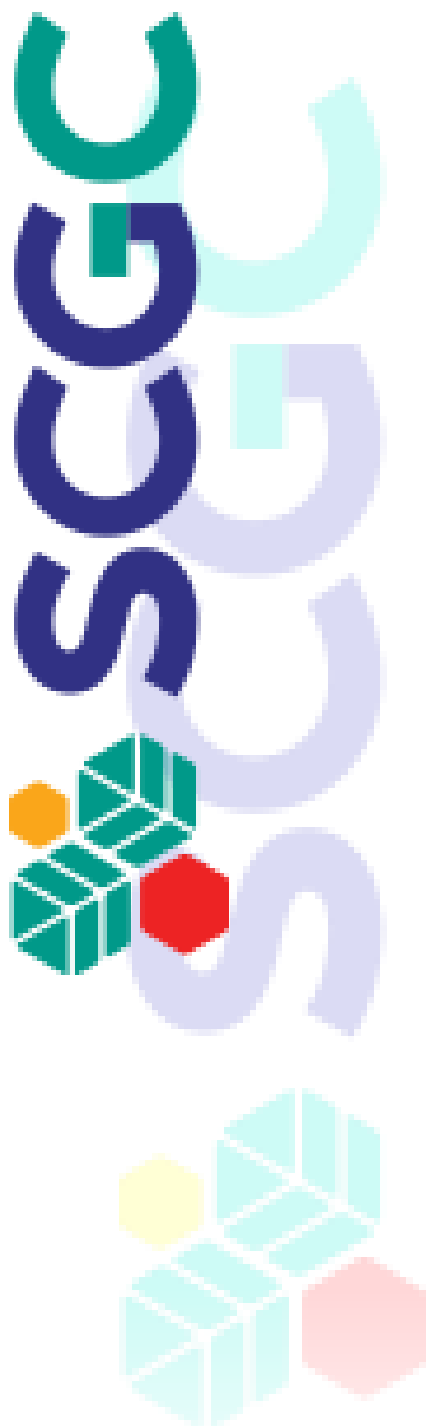
อนึ่ง หนังสือฉบับนี้จะส่งอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
ในวันที่ ๒๗ มิถุนายน ๒๕๖๓  
จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายพรต กลั่นกรอง)  
รองอธิบดี ปฏิบัติราชการแทน  
อธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก  
โทร. ๐ ๓๓๓๓ ๖๐๕๕ ต่อ ๕๐๐๑-๒  
ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th





✉ [bangkok@alsglobal.com](mailto:bangkok@alsglobal.com)



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